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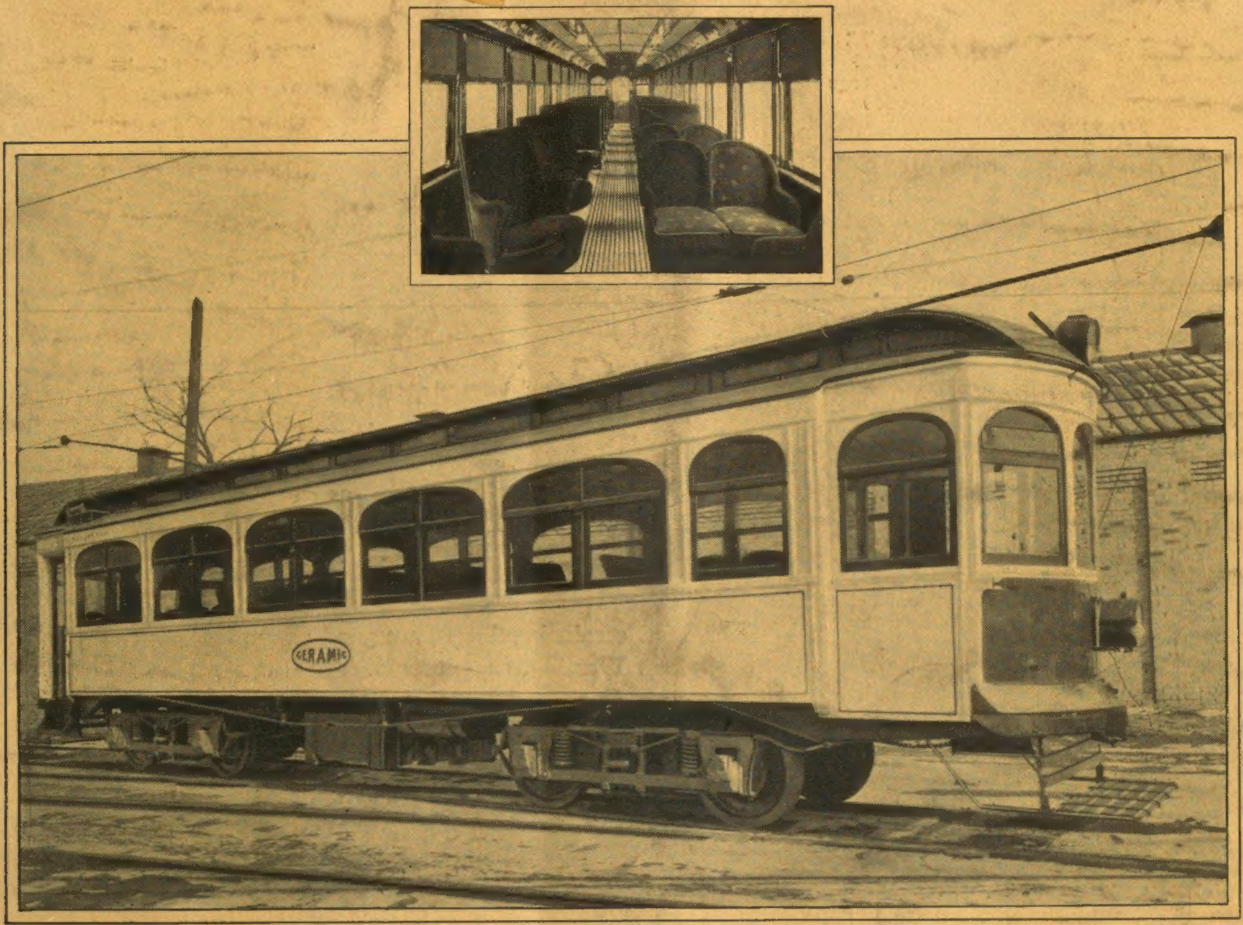
ELECTRIC RAILWAY JOURNAL

143



In de luxe service

BETWEEN Steubenville, Ohio, and Beaver, Pa., runs the Ceramic Flyer, a car de luxe in upholstery, painting, and in the schedule it maintains. To protect the reliability of operation of this car, on which passengers have come to rely, National Pyramid Brushes, Grade 402, are used exclusively in driving motor and compressor motor.

In displaying such confidence in these brushes, the Steubenville, East Liverpool & Beaver Valley Traction Co. pays a deserved tribute to quality and service. This company carries about twelve million passengers a year in city and interurban runs, and operates 56 cars. Its reliance on National Pyramid Brushes is of significance to traction companies large and small.

NCC grade 402 is one of the most popular of our brushes. We also make a number of other grades and types to suit special conditions. Our Sales Engineers will be glad to study these thoroughly before making brush recommendations that will give increased reliability of service.

National
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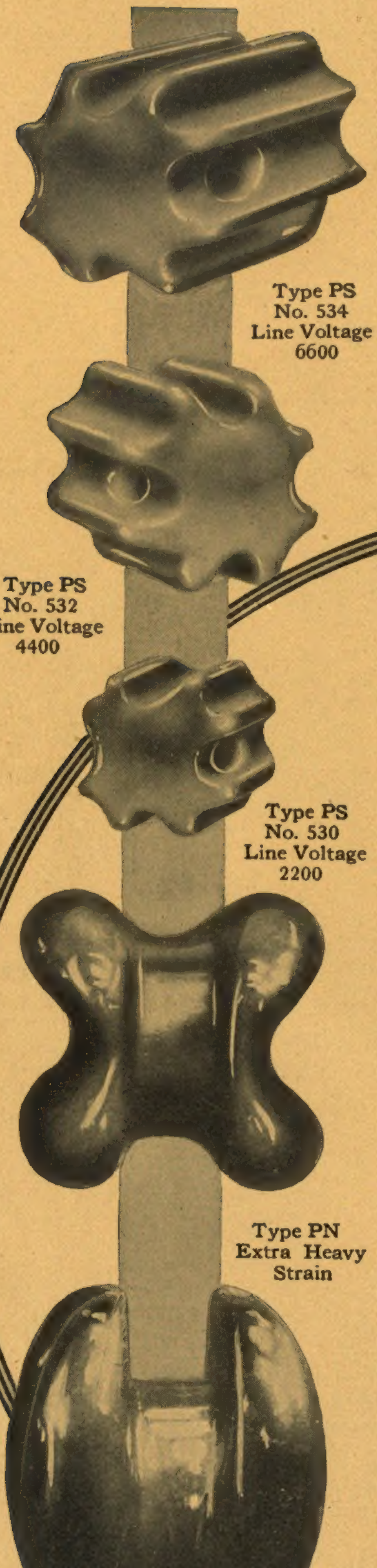
You Can Install

—and Forget



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Strain Insulators

THESE strain insulators are good examples of how Westinghouse steps over the bounds of custom to improve its porcelain insulators.

The type PS design was made to eliminate all sharp corners that might chip off, to give a more natural position for the cable reducing internal strains in the porcelain, and to increase the leakage distance between the cables.

Type PN insulators were designed for extra-high mechanical strength. The largest of this type will test close to 100,000 pounds. The open-end feature is an advantage where it may be desirable to remove a broken insulator without unlashing the connecting cable.

The same high grade porcelain that insulates high tension transmission lines makes these strain insulators safe to forget.

Westinghouse Electric & Manufacturing Company
Westinghouse High-Voltage Insulator Works
Derry, Pa. Emeryville, Cal.
Sales Offices in All Principal Cities of the
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Vol. 68
No. 10

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From the Pacific

COMMENT from afar is often of more value than that of near-by critics. For instance, a recent visitor to the JOURNAL office, who comes from one of the British possessions in mid-Pacific, said that this paper is the most valuable periodical he receives.

"Through its aid," he continued, "I have been able to analyze the various situations as they have arisen in the United States and prepare in advance to meet them. It was that way with the jitney, with the one-man car and with the merchandising of transportation. I have been able to get such a clear picture of transportation in your cities that when I visited them this month there was little more I could learn. The information had reached me long before through the columns of the JOURNAL."

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SAVING THE RAIL SAVES THE RAILWAY

The Public demands speed

You can speed your cars safely only on good track.

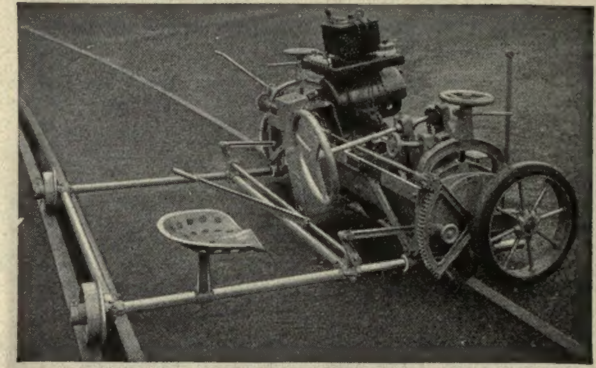
You can speed noiselessly only on good track.

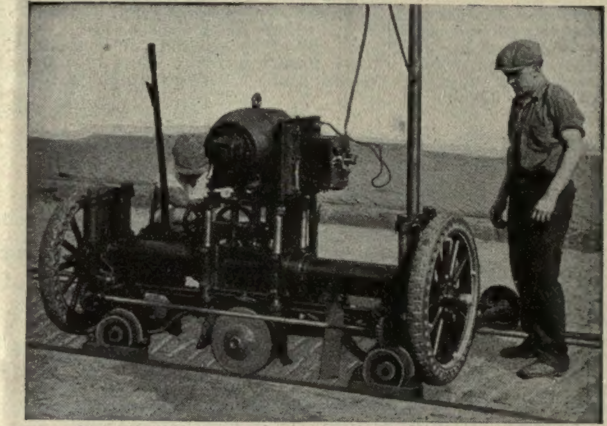
You can speed comfortably only on good track.

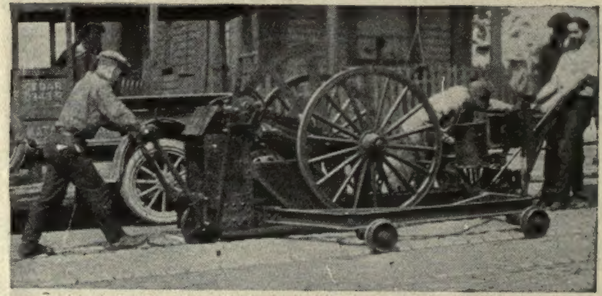
You can speed economically only on good track.

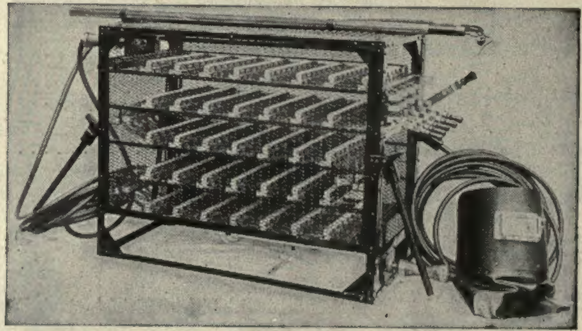
Smooth, silent, speedy track is easy to own and cheapest to own.

Here is the equipment for modern economical track maintenance.


"Improved Atlas" Rail Grinder


"Imperial" Track Grinder


Reciprocating Track Grinder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Railway Trackwork Co.

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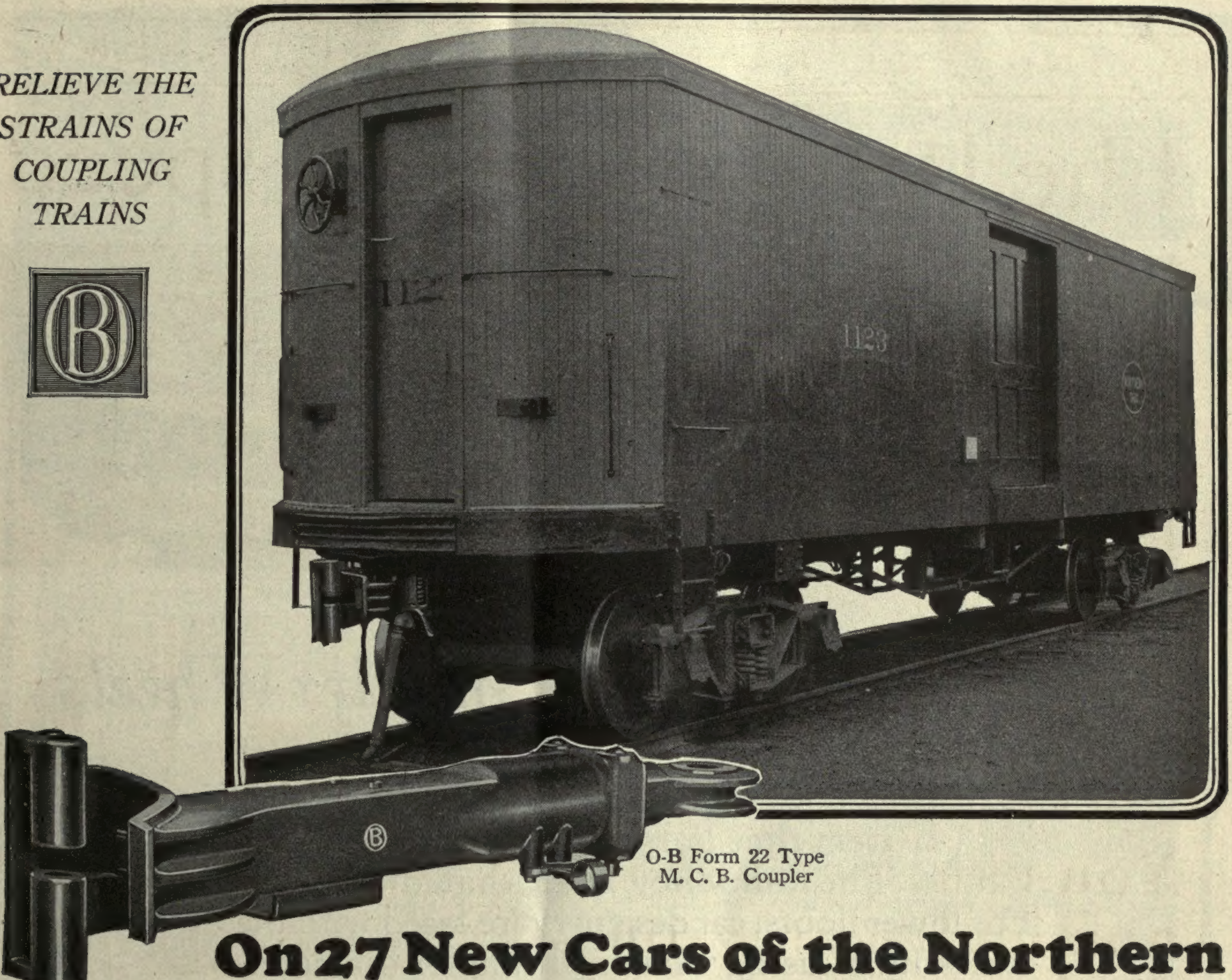
SAVING THE RAIL SAVES THE RAILWAY

RELIEVE THE STRAINS OF COUPLING TRAINS



O-B Form 22 Type
M. C. B. Coupler

On 27 New Cars of the Northern Ohio Traction and Light Co.

CATALOG 20
1926-7
OHIO BRASS CO.
Mansfield, Ohio U.S.A.

The new O-B General Catalog No. 20, contains the complete story on modern coupler equipment. It includes information of value to every interurban operating official. Have you a copy?

HEAVIER and longer trains and more frequent traffic interchange demand correspondingly stronger couplers. Such coupler equipment is essential if cars are to be kept in profitable operation with little or no maintenance.

In choosing couplers for its 27 new interurban freight cars, the Northern Ohio Traction and Light Co. selected O-B Form 22 M. C. B. Type Couplers because in every respect they meet the requirements of the heaviest service. They solve the coupler maintenance problem—give years of trouble-free operation—save money by lowering operating costs.

Many other roads, particularly in C. E. R. A. territory, use O-B Type M. C. B. Couplers as standard equipment. Complete particulars sent on request without obligation. Address

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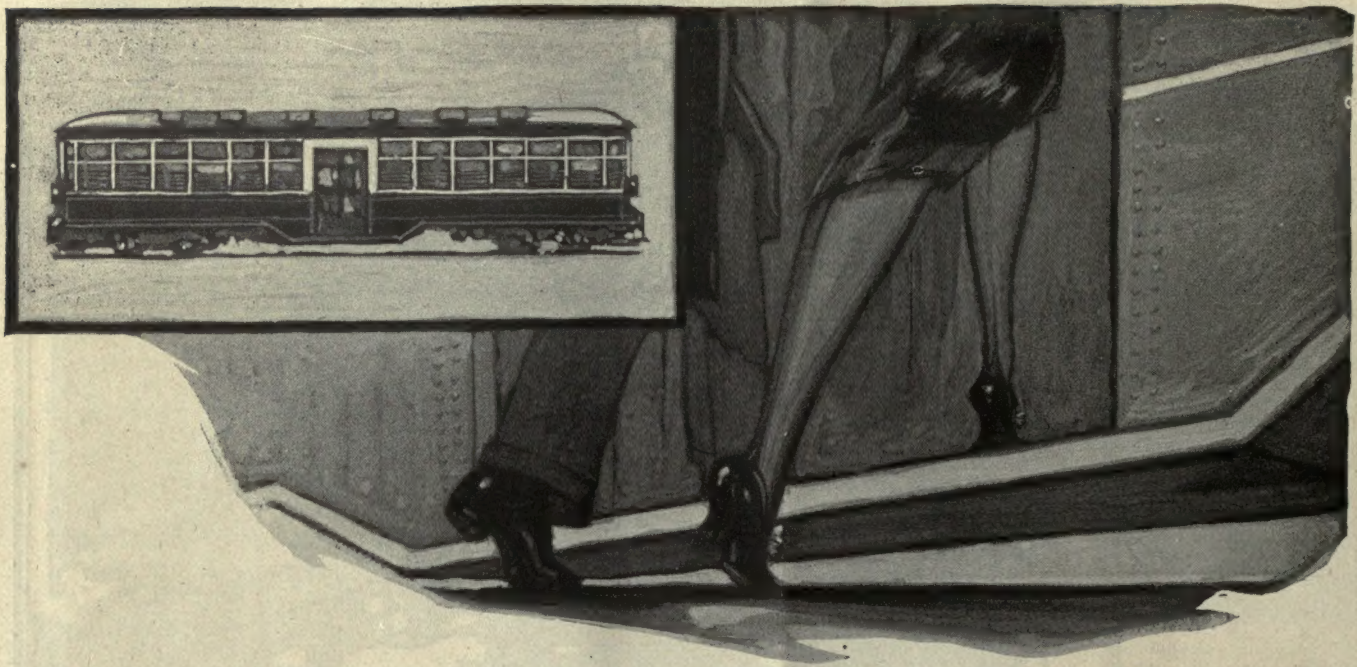

Low Level Floors and Smaller Wheels

REDUCING the height of the steps is another item that helps to please the public. The tendency is in that direction! For lower floors, car designers are faced with the necessity of using wheels of smaller diameter. And here the problem of wheel wear becomes acute. Revolving at higher speeds, these smaller wheels are subjected to more rapid wear. The effects of rapid acceleration and braking are more severe.

Here, if anywhere, a "one-wear" and a long wear wheel is needed. The wheel which needs no contour reconditioning—the wheel which doesn't wear flat—the wheel which retains most perfectly its original diameter—this is the wheel for the low level car.

Only one such wheel exists—the Davis "One-Wear" Steel Wheel.

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NEW YORK CHICAGO ST. LOUIS

Modernizing Your System!

Start with better Track by using

STEEL TWIN TIES

In concrete they cost no more than other track designs and will outlast the rail. Steel Twin Tie Track requires a minimum of maintenance during the life of the rail.

Construction and cost data and information or quotations on your requirements will be gladly furnished.

The International Steel Tie Co.
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation

Built to Last!

TO USE *International* Creosoted Ties is to have ties that will last as long as the rail itself. This unusual long life is due to the careful selection and seasoning of the timber, and to the thorough treatment of that timber with high grade creosote oil.

High grade creosoted ties are giving twenty year service on railroad traffic. They will therefore easily withstand the much less severe wear of electric railway service.

It is decidedly uneconomical and not in the interest of timber conservation to use inferior ties or poorly treated ties. They cannot last in service. The little you save in first cost is soon wiped out and turned into an actual loss by the rapidly increasing costs for maintenance and track disturbances.

Use ***International*** Ties—they are made to last—and are cheapest because they last longest.

Let us quote you on your requirements.

International Creosoting & Construction Co.
General Office—Galveston, Texas

International HIGH GRADE CREOSOTED TIES

Announcing the New

Franklin

High Voltage Porcelain

Insulators

Patent applied for

Franklin Insulators are now made with a new joint construction which absolutely prevents thermal stresses within the insulator from breaking the insulator tops.

Franklin has overcome these thermal stresses and has retained the mechanical strength without lowering either puncture or flash-over characteristics.

Franklin leads the industry by eliminating this greatest cause of failure in the modern multipart insulator.

Call an E. S. S. Co. salesman and make him prove it, now.

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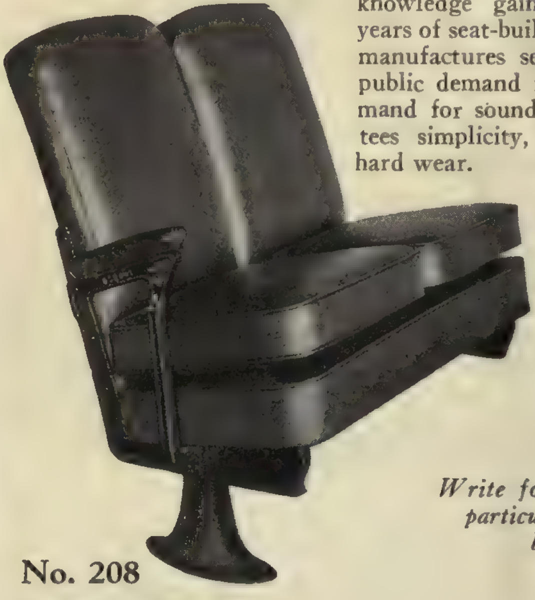
Build Up Public Prestige With Comfortable Seats

Since the riding public of today demands every convenience—comfort in seats is of vital importance in attaining and retaining public prestige.

Knowing this fact, and by applying the knowledge gained during more than fifty years of seat-building experience, Hale-Kilburn manufactures seats that not only satisfy the public demand for comfort but also your demand for sound construction—which guarantees simplicity, minimum weight and long, hard wear.

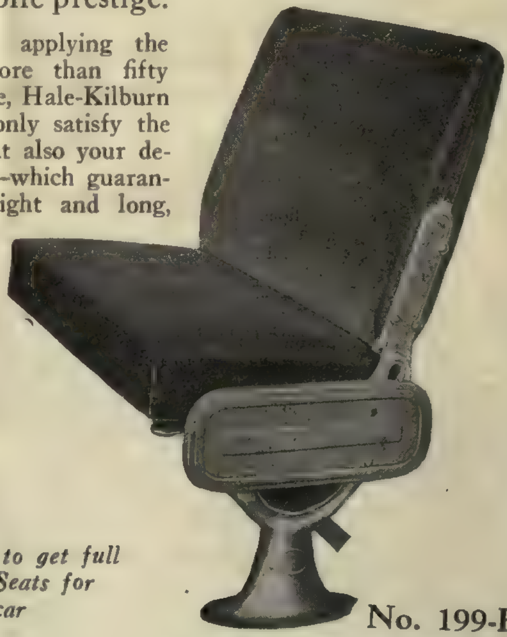


No. 208

DeLuxe Bus Seat

Designed especially for bus service this seat has divided back, spring cushions and air cushion pads upholstered in leather or imitation leather as specified.

Write for our catalog to get full particulars of H-K Seats for both bus and car



No. 199-F

Suburban Car Seat

Made to meet the demand for an inexpensive but comfortable seat for suburban and light weight interurban cars, this type has plush upholstered spring edge cushion and detachable back.

HALE-KILBURN COMPANY

General Offices and Works: **1800 Lehigh Avenue, Philadelphia**

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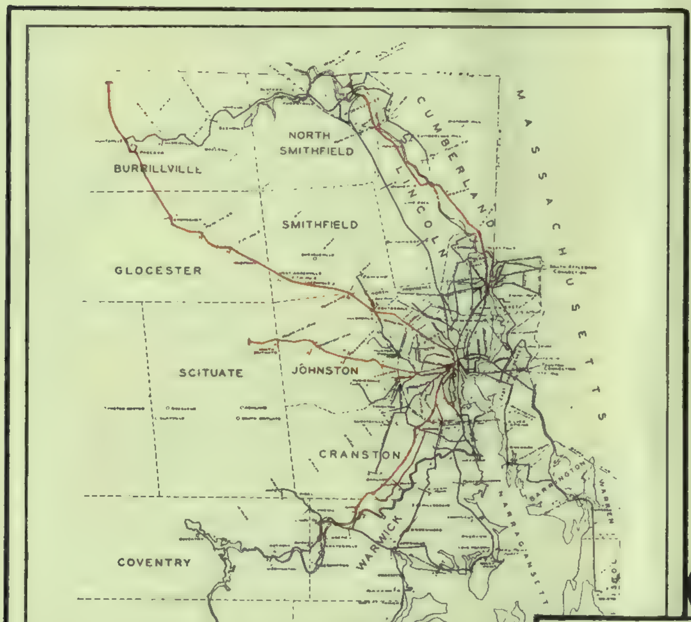
Hale and Kilburn SEATS

A million people a year ride in **YELLOW COACHES** *in Providence R.I.*

YELLOW KNIGHT

What YELLOW COACHES are doing on four routes *for the* United Electric Railways Co.



THE United Electric Railways Company, at Providence, R. I., know the value of motor coach operation as a solution to transportation and cost problems. That they know the meaning of Yellow Coach performance is proven by the fact that their last three orders for motor coach equipment have been for Yellow Coaches.

United Electric Railways Company are adopting the logical practice of linking motor coach operation with street car service to extend transportation facilities to communities not reached by car lines, to furnish auxiliary service to street car routes and to save money by cutting down losses on unprofitable lines of operation by substituting motor coaches for cars. Their buying trend shows also that they are standardizing on Yellow Coaches to bring about maximum economies of motor coach operation.

ROUTE 1

Chepachet, Pascoag and Wallum Lake Line

On this 24-mile route, a real problem is being solved by Yellow Coaches.

Losses incurred by the traction line were heavy, the street cars running to Chepachet. Three miles beyond lay Pascoag, a community which the traction company desired to serve. How to save money and still extend service was answered by discontinuing the street cars and operating motor coaches—thus Yellow Coaches did two things—cut down expenses and won new passengers from a growing community.

Following the solution to this problem, Yellow Coaches soon extended three miles further to Wallum Lake, where the state Sanitorium is located. The extended route is now being served by Yellow Coaches and enables the company to turn in a profit that was formerly lost.

ROUTE 2

Arctic Bus Line

Here was the problem of a busy center located in Arctic, thickly populated but with a motor highway shorter than the trolley line. This condition invited possible street car patrons to use private automobiles in preference to the street cars.

To win back this patronage, Yellow Coaches were placed in operation on an 11½ mile limited stop route, making the run in 40 minutes, and the trolley line was placed on a reduced operating schedule.

Yellow Coaches operate over this route on a 12 minute headway. Two extremely bad hills test performance, but Yellow Coaches take the grades easily, at all times.

Thus another specific problem was successfully solved through Yellow Coach operation and revenue which formerly had slipped away is now being regained.

ROUTE 3

North Scituate Bus Line

There was no mistake here about the problem, nor its need for solution. The issue faced was clear cut and demanded action. Traction service was costing too much, and again Yellow Coach economy was enlisted.

On January 11, 1925, the trolley service was discontinued and Yellow Coaches began saving money, effecting an immediate and profitable reduction in expenses.

This 10.10 mile route is looked upon as a difficult run. Steep hills must be climbed and a hard schedule maintained. As usual Yellow Coaches are coming through and going over the top. The economy of their operation as against trolley service is reflected on the profit side of the company's books.

ROUTE 4

Pawtucket and Woonsocket

Pawtucket and Woonsocket, two busy cities, with many interlocking interests, were dependent on connection by trolley until Yellow Coaches, for the first time, gave them service by motor coach over the connecting 12.20 mile highway.

Until this move was made, the service rendered by the street cars had been operated at a loss, and to save money the traction company pulled off the trolley line on February 7, 1926. The difference in cost between street car and motor coach operation represents a clear gain and enables the company to earn a profit on its Pawtucket-Woonsocket route.

Thus, Yellow Coaches are solving an inter-city problem on this route, winning public favor and reducing expenses.

Also

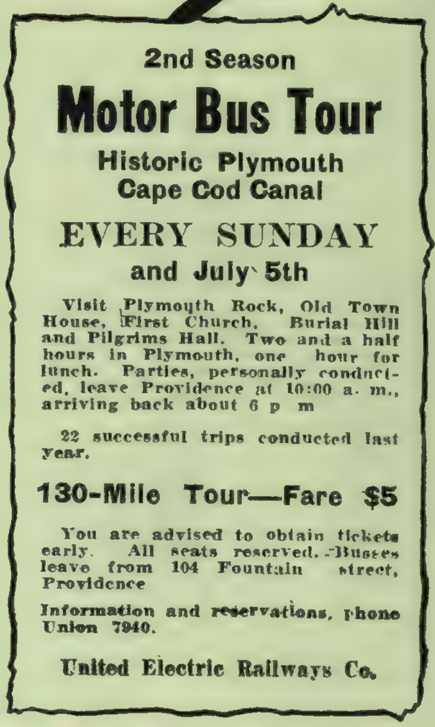
The United Electric Railways Company keep two Yellow Parlor Coaches in service to build up their charter business and for Sunday trips to Plymouth—a tour of 130 miles.

Last year, twenty-two successful trips were conducted, Yellow Coaches standing the gaff and operating with comfort to passengers and at a profit to the company.

The United Electric Railway Company operate other makes of motor coaches, thus establishing a good basis on which to test and compare Yellow Coach performance. That they are now standardizing on Yellow Coach equipment is the best evidence that Yellow Coaches win by the successful low-cost service they render on the highway.

Two great institutions, Yellow Coach and General Motors, welded together for better service stand ready to serve you with—

1. Transportation experience.
2. Equipment designed and built to render low-cost, profitable miles.
3. Research that covers every phase of operation.
4. Manufacturing facilities that save you money.
5. Financial stability that protects you from "orphan equipment."



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Motor Bus Tour

Historic Plymouth
Cape Cod Canal

EVERY SUNDAY
and July 5th

Visit Plymouth Rock, Old Town House, First Church, Burial Hill and Pilgrims Hall. Two and a half hours in Plymouth, one hour for lunch. Parties, personally conducted, leave Providence at 10:00 a. m., arriving back about 6 p m

22 successful trips conducted last year.

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You are advised to obtain tickets early. All seats reserved. Busses leave from 104 Fountain street, Providence

Information and reservations, phone Union 7940.

United Electric Railways Co.

Let YELLOW COACH *plus* General Motors solve *your* transportation problem.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

YELLOW KNIGHT

The Simple Efficient and Automatic

OPERATION OF CAR DOORS

NP

—is essential where peak-load congestion calls for rapid interchange of passengers and for lessening both physical and mental labor on the part of your car operators. Operation of this kind is obtained by the Indianapolis Street Railways.

National Pneumatic Systems apply to every possible condition of service.

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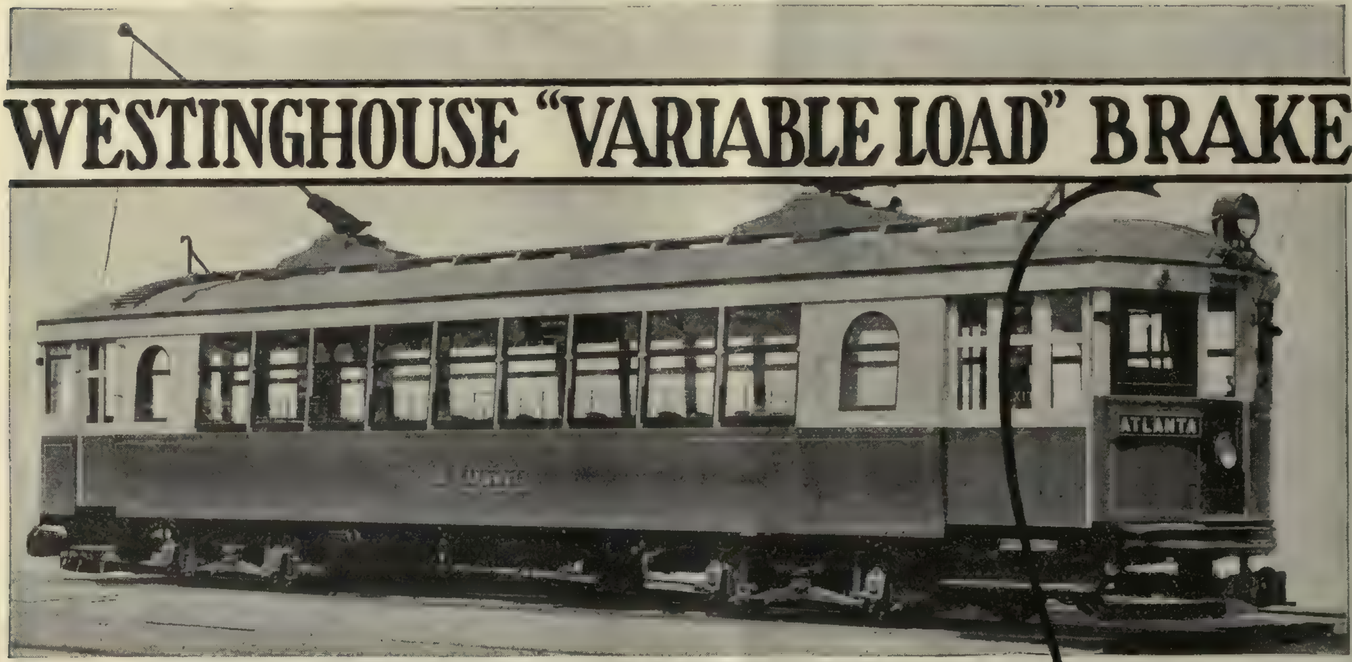
Executive Office, 50 Church Street, New York
General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

WESTINGHOUSE "VARIABLE LOAD" BRAKE



gives Uniform Braking with Varying Load

Georgia Railway & Power Company

has recently put into service ten new modern type cars on their Marietta and Stone Mountain interurban lines to furnish high class transportation for outlying districts of Atlanta.

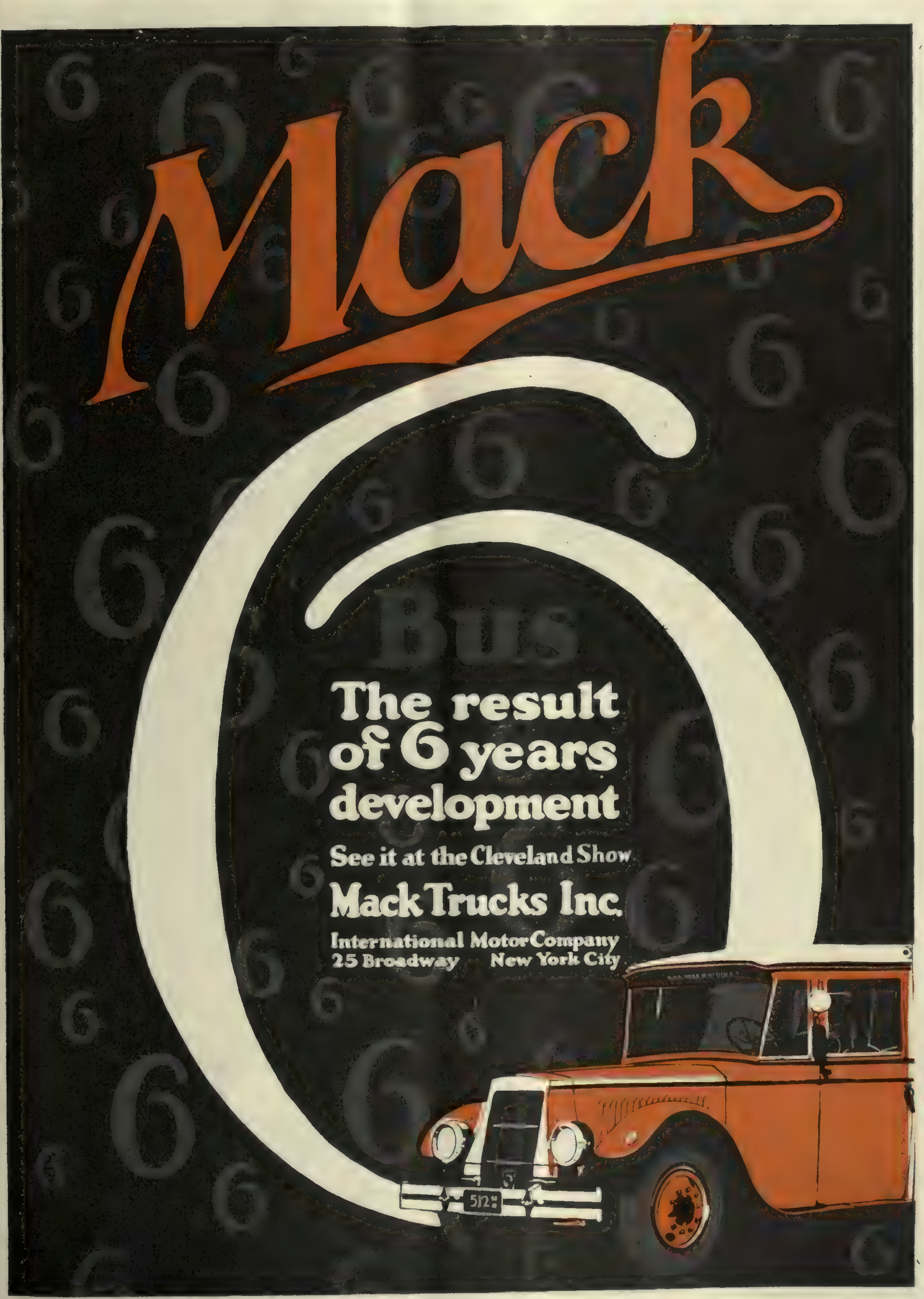
To assure safe and comfortable travel for patrons, these cars are equipped with all up-to-date devices, including the Westinghouse Variable Load Brake which provides adequate control for all car weights and speeds. The uniformity of stopping distances thus effected insures greater safety and increased schedule speeds.

Modern cars need modern brakes!

Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—*Ask for Descriptive Catalogue T-2045.*

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES



The result of 6 years development

See it at the Cleveland Show

Mack Trucks Inc.

International Motor Company
25 Broadway New York City

Gibraltar Bodies~

Trademark registered in United States applied for in foreign countries

Strength Appearance Comfort

Gibraltar Bus Bodies will be exhibited at A. E. R. A. Convention, Cleveland, October 4-8, on following chassis:

Studebaker
Reo
Safeway Six Wheel

Our representatives will be found at these exhibits.

Hotel Address, Hotel Cleveland

THE AUTO BODY COMPANY
LANSING, MICHIGAN

Designers and Manufacturers of Motor Coach and Bus Bodies *Open and Enclosed Automobile Bodies*

CAREFULLY INSPECTED—ALWAYS UNIFORM

SPIKES-BOLTS

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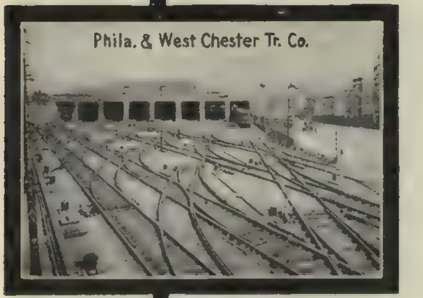
We are, as always, at your command.

Illinois Steel Company

General Offices: 208 South La Salle Street
Chicago, Illinois

Signals
and their Diversified Applications.

Have you more than scratched the surface to uncover available means of protecting and speeding up your traffic, and are you experiencing delays or perhaps accidents which might be eliminated by the use of one or more of the following means?



1.—Automatic semaphore or color light block signals, controlled by continuous track circuits.

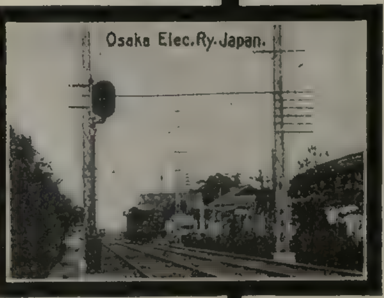
2.—Electro-pneumatic, electric, electro-mechanical, or purely mechanical interlocking systems at terminals or at grade crossings with other railway lines.

3.—Highway crossing protective devices of flashing color light, wigwag and audible types or combination of same.

4.—Remotely controlled switches at outlying sidings.

A statement of your problem places you under no obligation and if it appears to our engineers that your conditions can be improved by installation of our materials, we shall be glad to furnish complete details.

Electric Railways which are large users of Union automatic signal and interlocking systems are:



Chicago, Lake Shore & South Bend Ry. Co.
Chicago, South Bend & Northern Indiana Ry.
Kansas City, Clay County & St. Joe Ry. Co.
Washington, Baltimore & Annapolis Elec. R. R.
Interstate Public Service Co.
Pacific Electric Ry. Co.
Illinois Traction System
United Elec. Rys. Co.
Scranton & Binghamton R. R. Co.
United Railways & Elec. Co.
San Francisco-Sacramento R. R.
Northern Texas Traction Co.

Trade Mark

Union Switch & Signal Co.

Trade Mark

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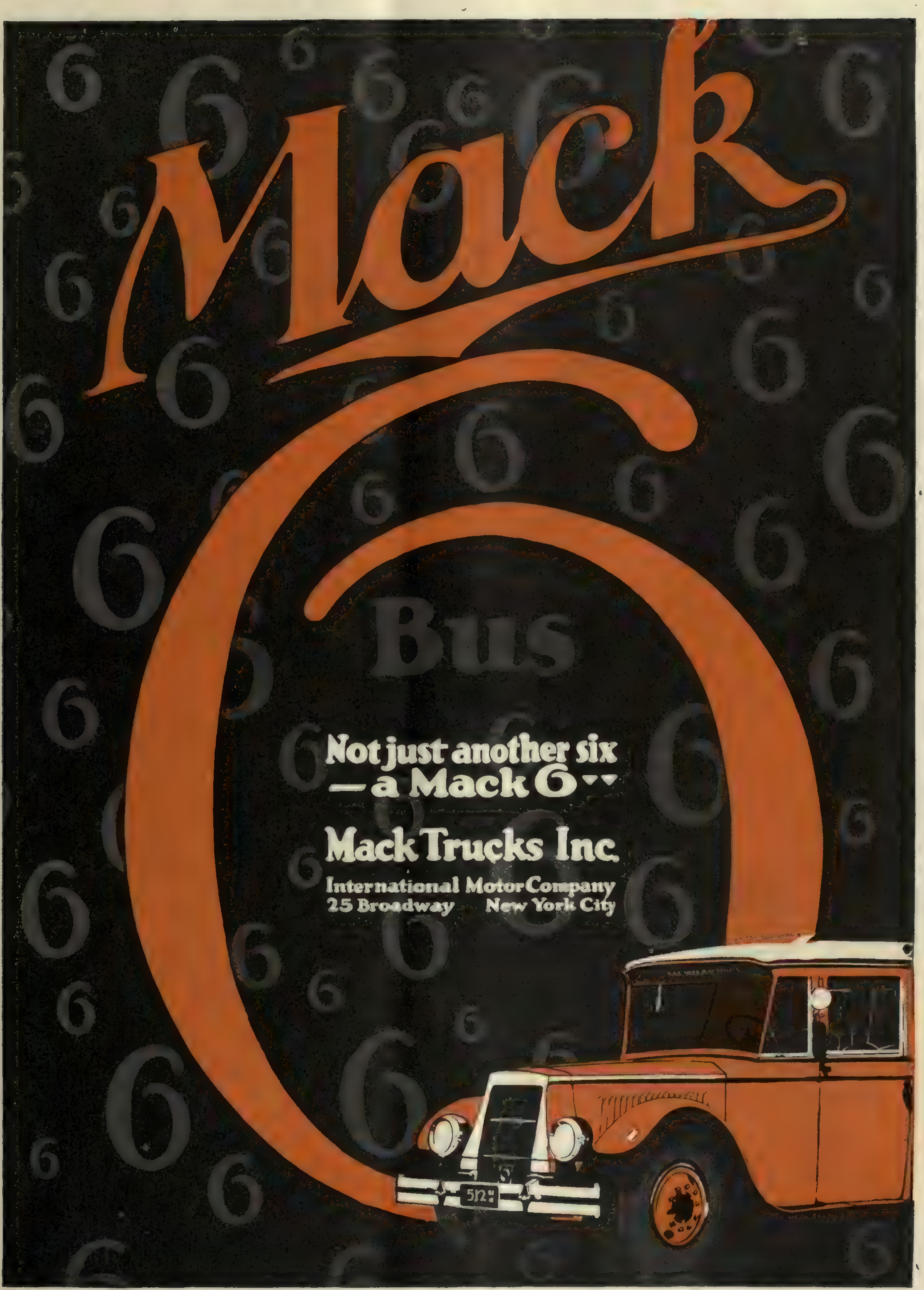

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330-24

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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CHARLES GORDON, *Editor*

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Invite Your Public Officials to Attend the Cleveland Convention

OVER the signature of President Frank R. Coates, letters of invitation to attend the Cleveland convention are being sent out by the American Electric Railway Association to the Mayors of all cities in the country having a population of 25,000 or over. The letter calls attention to the fact that there is no diminution in the need for public transportation service, notwithstanding the increased use of the private automobile. It describes the character of exhibits that will be displayed and explains that there will be examples of typical forms of modern transportation equipment used in public service from all parts of the country, which will be of greatest possible educational value to city officials interested in the safeguarding of their public transportation service. The letter also makes specific reference to the program of meetings. Among the various subjects attention is called particularly to that of traffic congestion and the efforts which electric railways are making in various parts of the country to solve it. The invitation is extended not only to the Mayor but to any representative from the city's council or governing body.

Electric railway men throughout the country should supplement this letter by personal invitation. Get your Mayor, members of your city council or regulatory body to attend the convention as your guests. Urge your local improvement club, representative business men and other civic leaders to attend. Make it a personally conducted trip. Take them through the exhibits and to the meetings in which they will be interested. There will be an unusual exhibit of the latest developments in street cars and buses. They will quickly realize that street cars are a long way from the scrap heap. Show them the kind of equipment your town ought to have and then explain how it can easily be obtained by providing adequate fares and modern franchises. Here is a complete transportation education in itself. Make every effort to see that *your* public officials get it.

Sell More Rides by Making Them Easier to Buy

ONE of the fundamentals of successful selling is that of making the product easy to buy. This applies in the selling of rides in these days of much competition in transportation and of high standards as to speed and comfort just as it does in the case of merchandise. More and more are the principles of merchandising becoming necessary in transportation management. In the discharge of this selling function publicity is indispensable.

The sign on a car, like the label on a can, constitutes publicity of the basic variety. But it isn't enough simply to mark cars with the usual destination signs if more can be done to direct the traveling public in its fullest use of them; that is, to make a car ride more easily purchased. Signs on the street also can be utilized to advantage at good strategic locations. There are heavy loading points where only regular patrons can be expected to be familiar with car movements. There are important centers where the various cars leave from sufficiently different points to cause confusion. There are main streets where information as to the destination and the time of cars passing would be a boon to many. In other words, the usual "Car Stop" and "Transfer Point" signs may well be expanded so as to be of real service, not only to solicit the stranger's patronage but to serve shoppers and other infrequent local riders as well.

The need for having schedule information more widely posted is manifest by questions frequently heard: "Do I get a Bellevue car here?" or "When will there be a car to the south side? It is seen in the little disappointments occasioned by changes in the routing of cars, which were announced to the public, but forgotten. It is felt by taxi customers who would prefer the trolley, if the way were pointed out. And every such sign on a board or a pole, helping to sell more rides, by making them easy to buy, carries with it the thought that the railway company has the interest of its patrons at heart; that it is anxious to render the largest possible measure of service.

In Chicago and Detroit Special Assessment Is Recommended

RECOMMENDATIONS just made by the Subway Advisory Commission in Chicago and the Rapid Transit Commission in Detroit both provide for the financing of a relatively large part of rapid transit construction by special assessment against benefited property. In St. Louis, also, those in charge of rapid transit investigations for the city favor this method of financing.

The Chicago recommendations are particularly significant in that those who make the report propose to assess themselves. The Advisory Commission is made up of large property owners and merchants in the Loop district, whose property would be directly affected by the recommendations. It is indeed a long step forward in providing adequate transportation on a self-supporting basis when property owners recognize the equity of financing construction out of the increased property value which comes from the improvement.

It is high time that the owners of centrally located business property recognize not only the equity but the business wisdom of subscribing to this method of financing transit construction. Although such construction is usually considered expensive, when analyzed in comparison with street widening projects in terms of the number of people served for transportation it becomes relatively low in cost.

Provision of rapid transit in central business districts, where congestion makes grade separation most imperative, is usually not favored by outlying districts. The common contention is that such facilities benefit the central district at the expense of outlying sections. When construction is financed by general corporate securities this contention is in a sense justified. But when the benefited property is made to carry a large part of the cost this position on the part of outlying property becomes no longer tenable.

Thus do the downtown property owners on the Chicago Commission demonstrate wisdom in their recommendations. Obviously, expensive subways should be constructed only in that area in which traffic density justifies the expense. But when general corporate funds are used there is always an intense pressure to build many miles of subways where they are economically not justified.

A rapid transit system built by special assessment is soon paid for by the benefited property and becomes a heritage to posterity. When financed from general corporate funds an enormous floating debt is passed on to future generations, and needed future additions to facilities are consequently curtailed. This has happened in New York. Although many times the subway cost is represented in the increased property values created, failure to utilize part of this created value for the subways themselves has brought about a most serious situation. If transportation construction creates property value over and above its cost, why should not a portion of the increase be diverted to provide transportation facilities? The electric railway industry may well afford to give increased attention to this important question.

Much Sound Thinking Contained in Chicago Report

COMING as it does from a group of Chicago merchants and owners of real estate in the busy Loop district, the Subway Advisory Commission's report published in this issue contains much sound thinking that may well be quoted by electric railway men throughout the country. Among other things, it carries a remarkable testimonial to the street car. One paragraph alone expresses the views of these men with such force that it bears repetition:

"The trolley or surface car is and probably always will be, so far as economics alone are concerned, the logical type of transportation. However much a district may increase in population, that population can be most cheaply transported by trolley cars. Motor buses are eliminated by economic considerations, as population increases. Trolley cars are never eliminated by economic considerations—that is, by consideration of the rate of fare."

To electric railway men this is most significant. Here, for once, is a group of representative citizens who seem to have succeeded in getting to the bottom of transportation economics. Not only in its clear-cut analysis of the advantages and limitations of street cars but also in its treatment of the other factors in local transportation, such as elevated lines and subways, this committee refuses to be swayed by popular fetish for one agency or another. It insists on approaching the use of each available form of transit on a basis of providing maximum service and convenience at minimum cost. To accomplish this it strongly advocates the policy of consolidation and co-ordination.

It augurs well for Chicago's future that some of its active leading business men are approaching its transportation problem on a basis so broad and sound. The committee studied the situation in Boston, New York and Philadelphia. It reviewed the many reports and plans that have been proposed for Chicago. Out of all this it prepared a set of underlying principles which would form a sound basis for transportation development in any city. Since these are the expressions of laymen—real estate owners and merchants—who have actually taken the trouble to study the situation broadly, their recommendations offer transportation men elsewhere a means of enlisting similar constructive interest in their own cities.

Promiscuous Competition Destructive to Both Car and Bus

IN THE development days of any industry there grow up inconsequential operations, uneconomically constructed or planned. The electric railway industry is not an exception. Even before the days of private automobiles or motor coaches, there were in existence many lines barely able to live. It is a surprising thing that many of these electric railways have survived so long. It is likewise a surprising thing that many of the bus operations started in the last two or three years have been able to continue existence in territory which indicates more enthusiasm than judgment on the part of their promoters. Progressive transportation men today do not divide themselves as electric car advocates or as bus advocates. They recognize in each type of vehicle certain advantages and limitations. The success with which each is utilized to render transportation service in any given community depends on the extent to which underlying economic factors are considered.

A recent news report in Dallas, Tex., carried a brief account of the sale of $80,000 worth of buses for $5,000 after two unsuccessful years of operation between Dallas and Fort Worth. Setting aside for the moment the question of whether a bus line between these two cities was justified in the face of the excellent service provided by the "Crimson Limiteds" of the Northern Texas Traction Company, the fact remains that neither the Northern Texas Traction Company nor the Dallas-Fort Worth Safety Coach Company could give an economically sound service in the face of the unregulated and promiscuous transportation that grew up between these two cities by the operation of innumerable touring cars and pleasure vehicles at a 50-cent fare.

The motor bus has performed a service in many parts of the United States too valuable to suffer such calamities as this. Likewise, electric railways, rendering as they do a transportation service vital to the development of modern communities, should be protected from unwarranted assault by individuals with no conception of the responsibilities of public service. Texas has no regulation to protect its local transportation lines. Under this condition there is a constant temptation for promiscuous transportation competition to spring up in the hope of reaping a quick profit at the expense of established carriers. The public must be made to realize that such competition either raises the cost of transportation or retards the improvement of the service that would be possible were only a single agent in the field. In this objective both car and bus have a common interest.

Because Habit Is Stronger than Common Sense

WHEN the first auto owner conceived the idea of "rolling his own" to business the highways were fairly clear of fast-moving vehicles and parking space in front of his office or near by was ample. The pioneer autoist experienced a glorious exhilaration, vowing that never again would he willingly ride a public vehicle.

As fellow autoists grew more and more common the glory began to dim. No speedy uninterrupted runs 'twixt home and office were possible. Even uptown crossings were guarded by traffic policemen, while downtown his speed was almost that of walking. Unless Mr. Autoist arrived half an hour ahead of his office opening, the attempt to find a parking place within reasonable distance was a hopeless undertaking.

Despite these disappointments, Mr. Autoist could still flatter himself that he was not compelled to ride with his fellow men. 'Twas true that the time-saving was less, that his nerves were badly frayed before the day's work was started and that he hadn't even read the stock quotations and baseball scores—but still, wasn't he the master of his movements?

Eventually the inexorable energy and liberal credits of the automobile manufacturers made the gas buggy as unaristocratic as the trolley car itself. This, in turn, produced a congestion that led to restricted parking in the business district.

So here we reach the *reductio ad absurdum* of automobile driving to business in large cities: Spend more money and time when the walk to and from the daily parking ground is considered, or, more delicious still, change at the parking ground to a public transportation vehicle to complete the trip. Several electric railways have themselves gone into the parking business and others no doubt will follow. Then we will have the spectacle of the railway collecting a parking fee equivalent to several fares plus, possibly, a full fare each way for the short haul involved.

Great is the force of habit which makes so many citizens insist so strenuously on their daily gallon of gasoline, but more and more of them are waking up to the foolishness of this practice.

Memphis Goes In for Modernization

MEMPHIS has long had reason to be proud of its street railway. It now has more reason than ever before to be so, for twelve of the 32 new rail coaches recently ordered for service there have been placed in operation. The expenditure involved is $475,000. This is no inconsiderable sum, and Memphis is fully appreciative of it, if reflections of praise contained in the daily press mean anything. Some of this comment is reproduced elsewhere in this issue.

In its magnitude the installation at Memphis exceeds that at Grand Rapids. The cities are fairly comparable as to size, but that as a criterion means very little in this instance. It is always difficult to measure one city or its needs in terms of another. Still, if experience in Grand Rapids means anything, then Memphis may look forward to increased patronage on the new cars.

As stated previously, the Memphis papers have not been slow in the past to accord their street railway favorable treatment. Even now an editorial written by the editor of the Memphis *Commercial Appeal* on the essentiality of the electric railway is going the rounds of the country. It is one of the most forceful things of the kind ever written because it reduces the place of the street car to the understanding of the man in the street. Similarly the news article elsewhere in this issue on the new Memphis cars has behind it the threefold idea of showing the type of cars being used, the nature of the comment received and the way in which the announcement was made. In this there may be ideas for other companies.

All this, however, relates to Memphis and Memphis alone. So far as the electric railway field is concerned the installation is of very great interest. It shows that appreciation is growing of the value of modernization and that the willingness is there to spend liberally to attain the desired end. Compared with recent installations of modern cars in Brooklyn, Pittsburgh, Chicago and other big cities, the Memphis installation does not bulk large, but Memphis itself is not large. The important point is that in the cities of moderate size, the ones that in the past have been hardest hit, the gospel of modernization is spreading.

Why Florida Realtors Make Gift of Railway Extension

NOT so long ago these columns recorded the curious fact that a Florida land development out of Miami deliberately chose to build an interurban electric railway instead of using buses over smooth and snowless highways. Now comes an even stronger example of the same choice in connection with suburban development at St. Petersburg. The realtors have not only built a railway, but have made a gift of their $90,000 expenditure to the St. Petersburg Municipal Railway!

The Shore Acres organization, headed by a past-president (N. J. Upham) of the National Association of Real Estate Boards, evidently had good reasons for its broad-minded action. Developers of subdivisions know that about the first question the prospect asks is, "What kind of railway service have you got here?" Realtors who do business in a big way understand the prospect's point of view. They also understand that the day of railway-paid extensions into new territory has gone by. If $90,000 put into 3 miles of track construction can add hundreds of thousands of dollars value to their subdivision, such an investment is mighty good business if the extension does not have to be separately operated.

What is more logical, then, than the presentation of the extension to the existing city-wide railway system? The residents of the new area are not compelled to pay the higher fares that a separate bus route would entail and they enjoy the further advantage of free transfer to the remainder of a system whose reliability is beyond doubt. On the other hand, the railway is much more willing to take over such an extension than if it had to find new capital for track and line in addition to new cars.

Not the least interesting fact about St. Petersburg is that the municipality took over the railway on July 1, 1919, from the then owners who were on the point of junking the lines. One-man operation with light-weight cars soon followed the purchase. Careful management plus the continued healthy growth of St. Petersburg produced the confidence in the local railway so strikingly manifested by Mr. Upham and his associates.

No. 14

No. 12

No. 15

Latest Cleveland Automatic Substations

SUBSTATIONS Nos. 12, 14 and 15, located in the central district of Cleveland, replace the Viaduct power generating station. These stations are the last three of the ten automatic substations constructed. Considerable attention has been paid to the architecture, color and the texture of the brick, in order to make it harmonize with the surrounding neighborhood. Substation No. 15 will later be incorporated with the power service department building when this is constructed.

With Similar Dimensions, Varying Architectural Treatment Has Been Given

THESE three automatic substations, Nos. 11, 13 and 16, serve areas adjacent to the downtown congested district. While they carry a proportionate share of the normal load, they have been placed as a second line of defense in case the downtown substations should fail.

No. 16

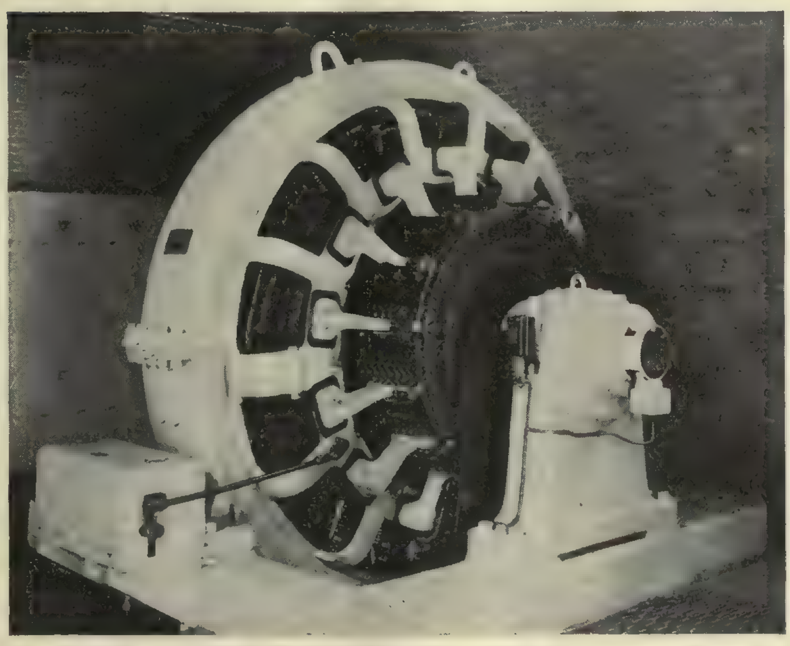
No. 11

No. 13

Cleveland Railway Extends the Use of Automatic Substations

All Power Is Now Purchased and Converted Through a System of Manual and Automatic Substations—Ten of the Fifteen Substations Are Automatic, but All Are Supervised by a Control System Centralized in the Dispatcher's Office—Standard 1,500-Kw. Units Used in All Substations

By L. D. Bale
Superintendent of Power the Cleveland Railway



The Standard 1,500-Kw. Rotary Converter Installed in One of the New Automatic Substations of the Cleveland Railway

This is a six-phase, 60-cycle, 514-r.p.m. machine and is typical of the total of 37 such units installed on the system. The converters in all of the newest stations have only a slight modification, chiefly in the substitution of high-reluctance interpole fields for the straight series type.

WITH the assumption of its load by three automatic substations completed on Nov. 6, 1925, the remaining power generating plant owned and operated by the Cleveland Railway was discontinued from service on that date. It has since been dismantled and scrapped. This placed the railway system on an all-substation basis, operating from alternating-current purchased power.

This plant, designated as the Viaduct power plant, was located immediately adjacent to the downtown, congested area of Cleveland. Its abandonment marks the passing of an extremely interesting period of development and progress in the production of energy for electric railway transportation. In addition, it brings into prominence the automatic substation as a major source of power even for congested areas of metropolitan systems, thus making available the most modern means of economical conversion and distribution of railway energy. In this particular instance rearrangement of the power system by the addition of the new stations described in this article has made possible the retirement of approximately 200 tons of d.c. distribution copper with the accompanying elimination of energy loss and a saving of annual charges.

The retired power plant, erected in 1892 for the Woodland Avenue & West Side Railway, was the subject of favorable comment throughout the engineering fraternity at various times during its existence. The total capacity of the plant was originally 1,500 kw., made up of three triple-expansion marine engines, each direct connected to two 250-kw., 500-volt, direct-current Westinghouse generators. Steam was supplied by Scotch marine type boilers. The switchboard consisted of a 12-in. green enameled brick wall surmounted by an ornate golden oak cornice upon which were carved the names of the directors and officers of the company.

Ensuing developments in electric railway transportation caused the plant to be increased from time to time by installation of additional equipment, in many instances replacing older equipment. This continued until at the time of its retirement the capacity had reached a total of 8,100 kw. of Corliss horizontal reciprocating steam engine-driven direct-current units.

The substations replacing the Viaduct power plant, Nos. 12, 14 and 15, are located in the area formerly served by that plant. These three stations were a part of the construction program which included seven automatic substations, involving a total capacity of 15,000 kw. Three of the four remaining new installations, Nos. 11, 13 and 16, are situated in areas adjacent to the territories served by the downtown stations. The latter three stations have practically a capacity load derived from the areas in which they are located. They are also intended to act as a safeguard to continuity of power supply in the event of failures occurring in adjacent stations and affecting the surrounding territories, particularly the downtown areas. The seventh station of the group, No. 10, is located beyond the distributing zone of an existing manual substation where low voltage conditions were experienced.

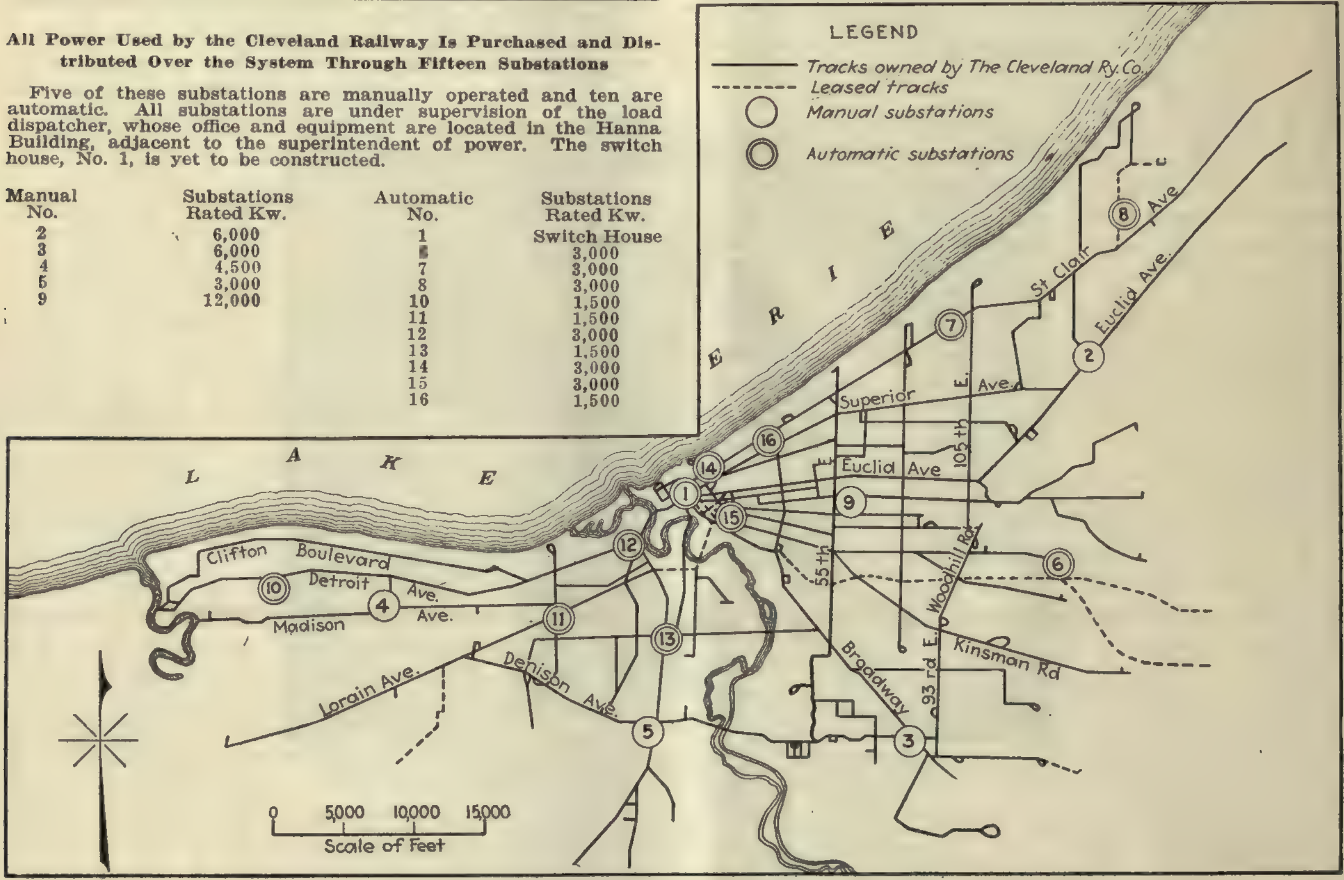
Stations Nos. 12, 14 and 15 have each an installed capacity of 3,000 kw., made up of two 1,500-kw. converters, while stations Nos. 10, 11, 13 and 16 contain but one 1,500-kw. converter each, there being room, however, for an additional unit.

It will be noted by referring to the accompanying map, which indicates the locations of all power facilities of the company, as well as the type and capacity of each, that the five manually operated substations have an aggregate capacity of 31,500 kw. and the ten automatic substations 24,000 kw. The original automatic substations, Nos. 6, 7 and 8, were described by the writer in three articles which appeared in ELECTRIC RAILWAY JOURNAL for March 3, 10 and 17, 1923. The remaining seven automatic substations are those included in the recent construction program.

All Power Used by the Cleveland Railway Is Purchased and Distributed Over the System Through Fifteen Substations

Five of these substations are manually operated and ten are automatic. All substations are under supervision of the load dispatcher, whose office and equipment are located in the Hanna Building, adjacent to the superintendent of power. The switch house, No. 1, is yet to be constructed.

Manual No.	Substations Rated Kw.	Automatic No.	Substations Rated Kw.
2	6,000	1	Switch House
3	6,000	6	3,000
4	4,500	7	3,000
5	3,000	8	3,000
9	12,000	10	1,500
		11	1,500
		12	3,000
		13	1,500
		14	3,000
		15	3,000
		16	1,500



There still remains the erection of an equalizer or switch house, near the Public Square, to complete this program. The switch house will provide facilities for interconnection of all direct-current feeders terminating at the center of the system. This will tend to equalize loading and provide means for rerouting of load under emergency conditions, thus serving as an added insurance to continuity of service.

The conditions as established in former studies and surveys preceding the rearrangement or installation of power conversion units on the system again dictated the practicability of continuing the use of the one standard size and capacity of converter, shown in one of the illustrations. However, the converters in the new stations have slight modifications which include the substitution of high-reluctance interpoles for straight series interpoles. Since the completion of these stations 37 converters are in operation on the system, each rated at 1,500 kw. and 514 r.p.m. on 60 cycles.

The remote control and supervisory system, developed immediately following the installation of the three original automatic substations, has been extended and is a part of the equipment of the seven new stations. The system load dispatcher, who controls operation of the automatic substations, also supervises the non-automatic stations through telephone communication with their attendants. This arrangement enables him to supervise and co-ordinate the operation of all power facilities of the company, thus making possible a degree of flexibility to the entire system heretofore not practicable.

Operating experience on this property has very definitely proved that the presence of a remote control and supervisory system no longer constitutes a refinement. This is particularly true where continuity of power supply is emphasized to the extent that protection to service takes precedence over protection to equipment. The necessity of a remote control and supervisory system can further be emphasized, under the above operating conditions, as the total capacity represented by the relatively small capacity automatic stations approaches or exceeds that of the manually operated equipment on the system.

Cleaner Station Campaign Elicits Fine Co-operation

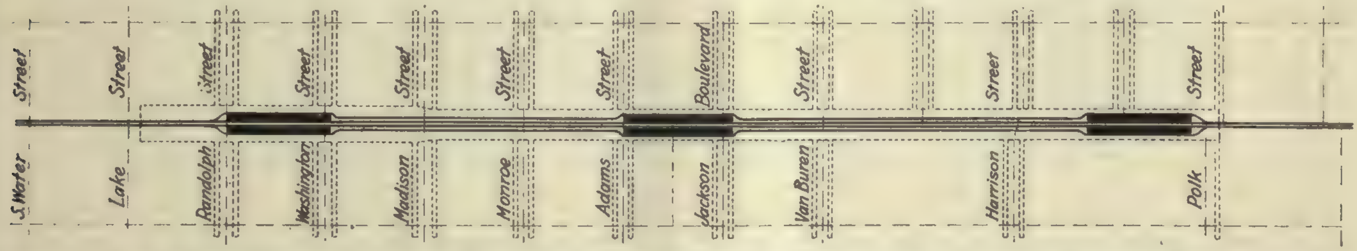
THE personnel of the Chicago Rapid Transit Company is in the midst of a campaign to improve the general appearance of station platforms, yards and other Elevated Lines' properties as a phase of its public relations activities. Monthly cash prizes have now been awarded for several consecutive months to the porters who have kept their stations the cleanest and the man on each division with the best record for the month is awarded an attractive honor banner. The banner is hung in the station, telling the public about the porter's good work in improving the appearance of the company's property.

Consolidated Transportation and Subways Recommended for Chicago

Subway Advisory Commission Proposes Extension of Rapid Transit Facilities by Special Assessment and Use of Traction Fund—Enabling Legislation Is Necessary for This Purpose and for Consolidation of Present Companies—Initial Program for a Subway Under State Street and One Under Washington, Michigan and Jackson Would Cost $36,400,000

BASED on at least seven major transportation studies during the past twenty years, Chicago's latest rapid transit report recommends an initial step costing $36,400,000, which would begin the co-ordination of all local transportation in the city.

The report is noteworthy in that, while written by a commission composed of downtown business men, it has recommended assessment of the benefited property as a means of raising funds for rapid transit construction. It further proposes that these property owners can assist by making voluntary contributions in case the assessments do not raise sufficient capital for the construction program. It is noteworthy that elevated construction is recommended in all cases as being more desirable than subways except in the central congested district.



Discharge Area of Rapid Transit Subway in State Street. Three Stations Are Planned with a Mezzanine Concourse Between Randolph and Polk Streets, with Branches on Lateral Streets Under the Sidewalks as Shown by Dotted Lines

The Subway Advisory Commission, which made the report, states that no less than 55 per cent of the cost of building the two subways recommended should be paid by direct assessment of the benefited property, and for this purpose has designated areas of four different grades. Should the amount raised by assessment be insufficient, it is suggested that the deficit may be made up by voluntary contributions on the part of business men. The plan contemplates that the remaining part of the construction cost be taken from the traction fund, which at present amounts to $45,000,000, representing the city's share of the residue receipts of the Chicago Surface Lines in accordance with its contract.

Consolidation of the Chicago Rapid Transit Company, operating the present elevated system, and the surface line companies now jointly operated by the Chicago Surface Lines is considered of paramount importance. It is recommended that the city immediately take steps to obtain the enabling legislation required to effect this consolidation and also the legislation needed in all probability to allow the city to levy the special assessment.

Not only did the commission make a study of the subway, elevated and rapid transit facilities in New York, Boston and Philadelphia, but the report devoted considerable space to an analysis of these types of transportation systems for Chicago. Likewise the previous engineering reports for subways in Chicago are reviewed briefly. Comparable charts show the earlier plans recommended in seven major reports since 1902.

Primarily this is a citizens' report, although guided by excellent engineering and legal talent. The Subway Advisory Commission was appointed on March 23, 1926, by Alderman Arthur F. Albert, chairman of the subcommittee on subways of the City Council's transportation committee. Its members are Russell Tyson, member of the firm of Aldis & Company; Gordon Strong of Gordon Strong & Company; Earl Shultz, manager of the Edison & Chicago Trust Building; Ernest J. Stevens, vice-president and manager of the Hotel La Salle and the New Stevens; Harry J. Powers of the Illinois and Blackstone Theaters; Barney Balaban, president of Balaban & Katz, and Elmer T. Stevens of Charles A. Stevens & Brothers. George M. Tobey was secretary of the commission. R. F. Kelker, Jr., was selected as engineering counsel. Mr. Kelker prepared the report on subways submitted in 1923. Eugene H. Dupee and F. D. P. Snelling were legal advisers to the commission in the preparation of this report. The text was drafted by Messrs. Strong and Tobey.

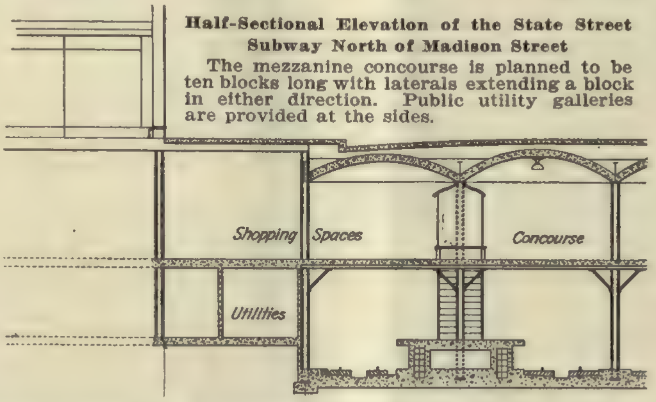
Four general sections comprise the report. The first, on general principles, lays down a basis for the consideration of all forms of urban transportation; the second is devoted to the specific plan recommended; the third is devoted to finance, the cost of the subway units recommended, the discussion of the assessment plans, the use of the $45,000,000 traction fund and the legal obstacles that lie in the way of accomplishing what the commission feels to be of paramount importance—the consolidation of the companies and the levying of the special assessment. The fourth chapter contains some sixteen specific recommendations for putting in effect the proposed plan. The first and second sections are abstracted below at some length.

URBAN TRANSPORTATION A PRESSING PROBLEM

Grouping of workers for collective effort, which forms the economic basis of our cities, has but one limiting factor in the future—that of transportation. The growth of our cities involves greater distances to be covered, and at any given rate of speed, greater time to cover them. It is the function of urban transportation to overcome these increasing distances and to give to the city of 1,000,000, 5,000,000 or 10,000,000 the same facilities of intercourse. The problem, great already, becomes greater each year and will become greater into an indefinite future.

Since a city depends in great part for its efficiency on the plan and the operation of its transportation, it is fair and right that its citizens should demand the maximum of speed consistent with the progress of engineering and with safety, the maximum of convenience and comfort and even of pleasure, and finally that they should demand this service at the lowest price commensurate with the labor, the management and the capital required.

In the development of urban transportation, up to date three different types have been established, the motor bus, the trolley car and the rapid transit train.



Half-Sectional Elevation of the State Street Subway North of Madison Street

The mezzanine concourse is planned to be ten blocks long with laterals extending a block in either direction. Public utility galleries are provided at the sides.

The motor bus requires a minimum of capital investment, so for a limited population served, even at a greater cost of operation per passenger carried, it will be cheaper. In such a district the bus will perform two functions: (1) Furnish transportation within the district itself; (2) serve as a feeder to transportation lines leading into the body of the city.

With growth of the district which it has been serving, the bus, with its greater per capita cost of operation, is forced outward and into districts of less population. In such a capacity it usually is the adjunct to the adjoining trolley car system. In the report, no further consideration is given to the bus, as it is not deemed suitable for the mass transportation under consideration.

However, a specialized type of bus, which may be called a pleasure bus, serves in quite a different capacity, somewhere between a transportation unit and a sightseeing means. It is principally important as showing the disposition of the citizen toward the "amenities" of transportation—a disposition which should be considered in planning any transportation system.

TROLLEY A LOGICAL TYPE OF TRANSPORTATION

With the population of a district sufficient to warrant a more highly developed transportation, for the sake of cheaper per capita operation, the trolley car becomes appropriate. While it requires a permanent plant and greater capital, by virtue of the greater number of passengers carried per car, with no increase in employees, the per capita cost of operation becomes less than with the motor bus. However much such a district may increase in population, that population can be most cheaply transported by trolley cars. They are never eliminated by the economic consideration of the rate of fare. The limiting consideration which does apply is rather one of engineering, that of rate of speed.

If a passenger makes but an occasional trip, the time consumed is not vital. But if he has a daily trip to make, such as one to and from work, it becomes vital. It is the best opinion that the time each way should not exceed 45 minutes, including walking to and from the car at each end of the trip. Accordingly, if one is to spend a maximum of 30 minutes on a trip, with a speed of 8 m.p.h. the maximum distance that can be traveled is 4 miles. The trolley car, under average conditions, offers a little more than this radius to the daily passenger.

In a town of 10,000 the average distances between one citizen and another and the places where they work might be placed roughly at ½ mile, so that no transportation at all is really necessary. In a city of 100,000, this average distance may be placed at 2 to 3 miles, which can be covered by trolley in fifteen to twenty minutes. No other transportation is necessary. But in a city of 1,000,000 the average distance may be placed at 5 to 6 miles. The trolley car requires some 37 to 45 minutes, so that the citizen who has to make this daily trip is entitled to a type of transportation at greater speed. This introduces the rapid transit train.

Car speed is uniform only when cross traffic is uniform. With no cross traffic, the trolley could make the same speed as the rapid transit line, so cross traffic becomes the limiting factor in the speed of the trolley car. As the size of the city increases this cross traffic increases as the center of the city is approached. This gives a second engineering reason for the introduction of the rapid transit train.

The rapid transit train is not to be expected to supplant the trolley car, except for long hauls or through the more central districts, with cross traffic to be avoided. As one function of the bus is to be a feeder to the trolley car, so in a properly co-ordinated system one function of the trolley car is that of feeder to the rapid transit train.

RAPID TRANSIT NEEDED FOR LARGEST CITIES

When a city approaches a population of 1,000,000 its citizens are entitled to the rapid transit train. Its two characteristics are rapidity of movement, made possible by a tracking that avoids cross traffic, and grouping of several cars in a train, with several doors, requiring a minimum of time for loading and unloading.

To avoid cross traffic, the tracks may be laid to one side, or above or below it. The first location, to one side of the cross traffic, is special, the Illinois Central system in Chicago being an example. A rapid transit system may be laid above the cross traffic either with masonry walls and an earth fill, or with steel columns and girders, known as "elevated." The former construction is used mainly by steam railroads, and is also in contemplation for the "super-highways" planned for Detroit. The elevated does not interfere materially with the street and alley system of a settled city.

Three serious criticisms of the elevated construction of the past are location in the street in place of the alley, unpleasing appearance and unnecessary noise. Where possible, except perhaps in industrial districts, such a structure should be located in an alley or on a private right-of-way. The damage to abutting property when elevated structures are erected on streets is serious and must be given more attention in the future than in the past. When the value of abutting property and the damage to the owners are sufficiently great this damage becomes the limiting factor in the use of elevated structures.

Elevated structures of the past have apparently been given no attention as to appearance. The elevated structures that have been built in Chicago may have been excusable in the past, but should be considered obsolete. While an elevated cannot rise to standards of some bridges, it, however, can show a genuine effort to be pleasing in appearance and worthy of the city of the future.

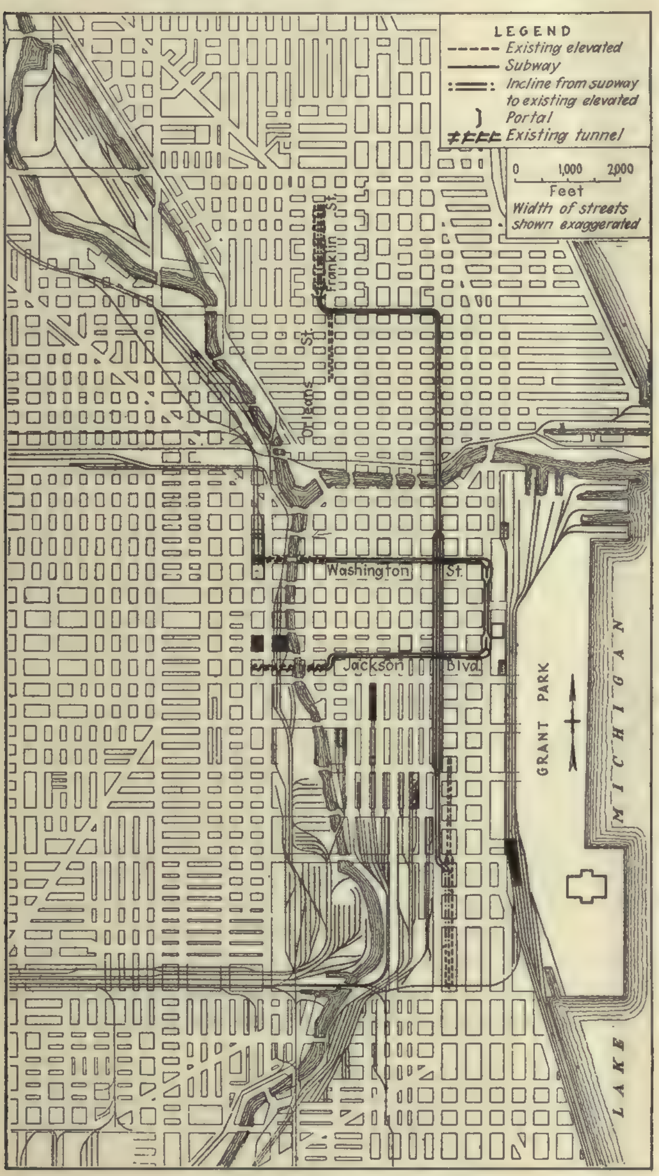
As to noise, it is understood that the track of an elevated structure can be bedded so as to develop but a fraction of the noise experienced at present. Until this improvement is insisted on engineers will continue to plan and erect the deafening structures of the past.

Aside from the limiting factor of damage to abutting property, the tracking of rapid transit trains on an elevated structure is the solution of rapid transit from the economic, the engineering and the passenger or human viewpoint.

The average cost of an elevated structure complying with the principles expressed, with two tracks and reasonable allowance for stations, can be considered to be, at present prices, $1,600,000 per mile. The cost of the only other possibility for rapid transit, a subway, may be considered to be $5,600,000 per mile.

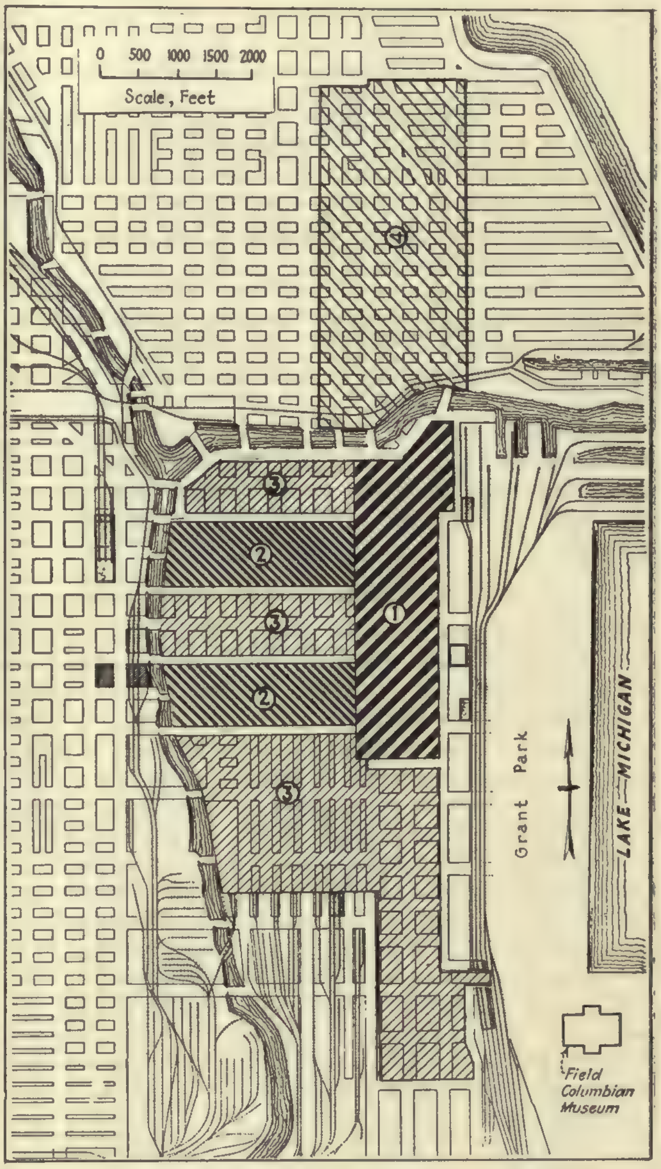
The foundation of rapid transit, speed, can be had on an elevated equally as well as in a subway. The safety of an elevated is believed equal to that of the subway, depending primarily on keeping the trains on the tracks, which can be done with equal facility above ground or below.

As to the passenger or human element involved, the passenger is entitled to, and if compelled will pay for, what may be called the amenities of transportation, for the pleasantness of the time spent in being transported. Another consideration is the health of the passenger. Ventilation, light and air are far superior in the case



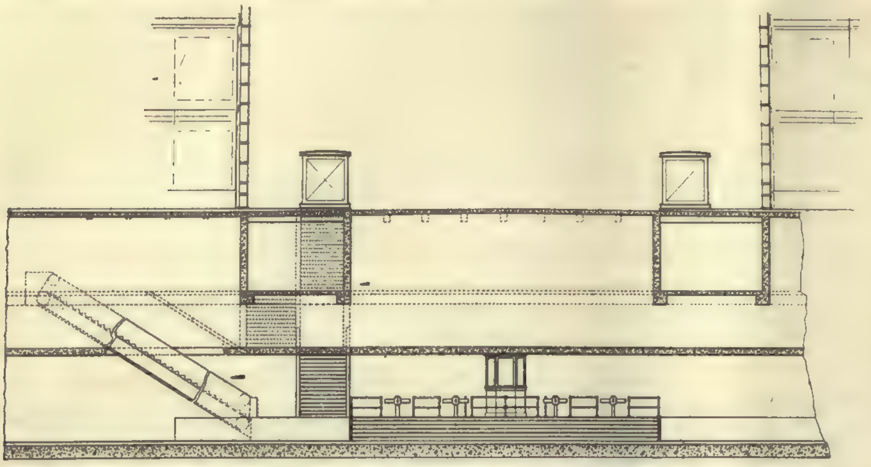
Basic Subway Plan of Chicago Subway Advisory Commission

The construction contemplated consists of a north-and-south rapid transit subway under State Street with four tracks in the congested area between Randolph and Eighth Streets and a double-track subway loop for surface cars under Washington Street, Michigan Avenue and Jackson Boulevard.



Assessment Zones for Chicago Subway Construction

The plan given in the report contemplates raising a large part of the cost by special assessment. It is proposed to divide the amount so levied in proportion to the direct benefits. The assessment area is in four classes: (1) to bear 65 per cent of the assessment; (2) to bear 20 per cent; (3) to bear 12½ per cent; (4) to bear 2½ per cent.



Cross-Section of the Washington-Michigan-Jackson Surface Car Subway
This is planned as a low-level line with rails 35 ft. below the street. Escalators are planned to carry passengers up and down at the stations.

of the elevated as compared with the subway, particularly in daytime. From this viewpoint, the citizen and voter has the right to demand that every possible mile of the tracking for rapid transit shall be on an elevated structure.

According to the report, for Chicago, except in such limited districts as may be proved absolutely to require subway tracking for rapid transit trains, the citizens have reason to condemn any proposal of subway construction.

RAPID TRANSIT BELOW GROUND CONSIDERED

The tracking for a rapid transit line may be laid below the cross traffic, either in an excavation open at the top, usually known as "open cut," or in an excavation covered on top, usually known as "subway." Use of the open cut is confined to private right-of-way, entirely separate from the street and alley system of the city. The subway constitutes no interference with the street and alley systems. So far as transportation is concerned, it differs from the elevated only in matters of engineering detail. So far as benefit to the city at large or to the neighboring property is concerned, it makes no difference whether rapid transit trains run on an elevated structure or on a subway structure. It is of utmost importance that the subway should be thought of, not as a new and entirely different type of transportation, but merely as a different location for the tracking of rapid transit trains.

To find a justification for the subway tracking, we must leave the field of transportation and consider the effect on abutting property. Since practically the whole case for subways rests upon the damage to adjoining property by elevated structures, the relative cost of construction must be considered. The average cost per mile of subway construction, $5,600,000, will be materially increased in the central business district by reason of the necessity of supporting high buildings without adequate foundations and by reason of the amount and complexity of sewerage, water, gas, electric, telephone and other similar equipment. It has been estimated that such cost in a central business district may run as high as $8,100,000 per mile. Accordingly, the excess cost of subway tracking over elevated tracking of rapid transit trains may run from $4,000,000 to $6,500,000 per mile.

Estimating 4,500 ft. of private property as abutting on each side for each mile of street, 9,000 ft. of private property will be affected per mile of elevated structure. All of this property will be damaged if the elevated structure occupies the street. Assume a damage amounting to $100 per front foot of abutting private property, the total damage will be $900,000 per mile. But it is obvious that this charge will not warrant the increased expenditure of from $4,000,000 to $6,500,000 for a subway.

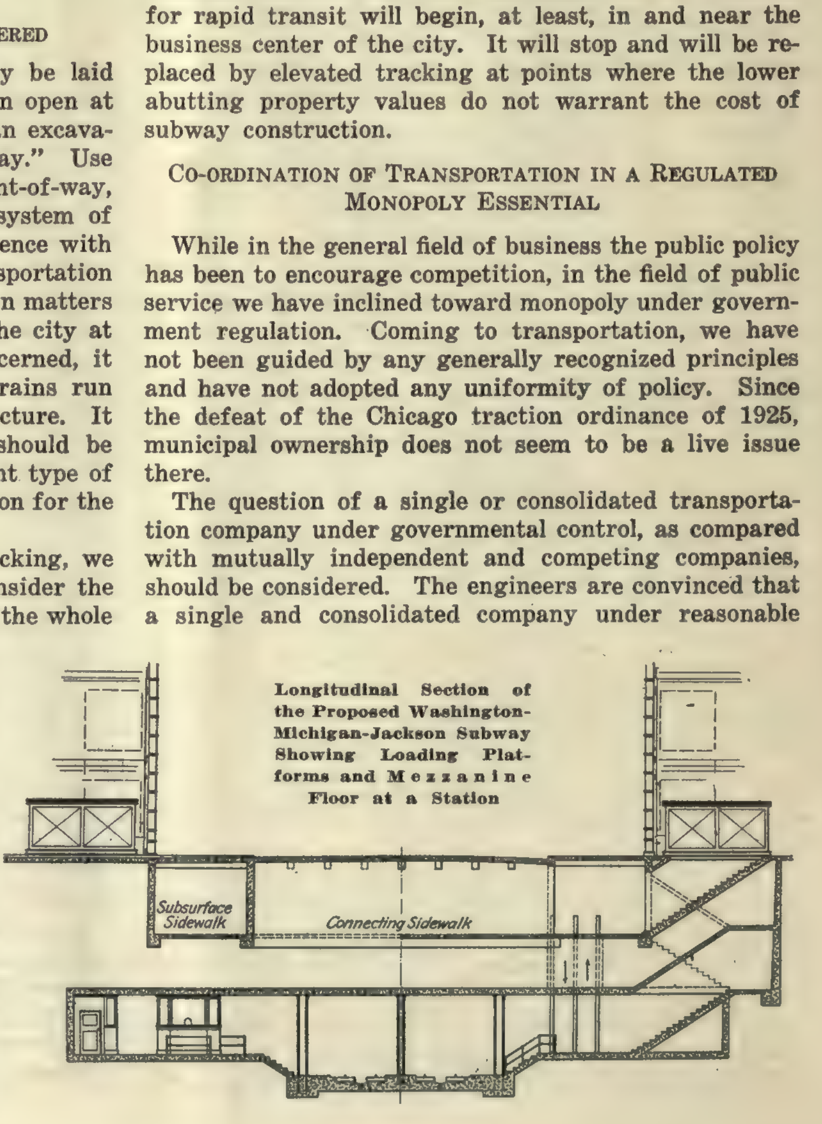
Assuming a damage resulting from an elevated structure of $1,000 per front foot, the total damage will be $9,000,000 per mile of elevated structure and it is obvious that it would be cheaper to pay the excess cost of a subway.

In general, the damage to abutting property depends principally on the value of the property, particularly if of one general class, such as commercial. Accordingly, if a damage of $100 a front foot resulted in the case of abutting property worth $1,000 a front foot a damage might in general be expected of $1,000 a front foot for property worth $10,000 a front foot. Since the higher-priced property is likely to be located in or near the business center of any city, the logical use of a subway for rapid transit will begin, at least, in and near the business center of the city. It will stop and will be replaced by elevated tracking at points where the lower abutting property values do not warrant the cost of subway construction.

CO-ORDINATION OF TRANSPORTATION IN A REGULATED MONOPOLY ESSENTIAL

While in the general field of business the public policy has been to encourage competition, in the field of public service we have inclined toward monopoly under government regulation. Coming to transportation, we have not been guided by any generally recognized principles and have not adopted any uniformity of policy. Since the defeat of the Chicago traction ordinance of 1925, municipal ownership does not seem to be a live issue there.

The question of a single or consolidated transportation company under governmental control, as compared with mutually independent and competing companies, should be considered. The engineers are convinced that a single and consolidated company under reasonable



Longitudinal Section of the Proposed Washington-Michigan-Jackson Subway Showing Loading Platforms and Mezzanine Floor at a Station

TABLE I—ALLOCATION OF COSTS FOR THE PROPOSED CHICAGO SUBWAYS

Subway	Train Level (Including) Stations)	Pedestrain Level	Total Structure	Operating Equipment	Total
State Street......	$16,900,000	$4,050,000	$20,950,000	$3,000,000	$23,950,000
Washington-Michigan-Jackson.....	9,900,000	1,450,000	11,350,000	1,100,000	12,450,000
	$26,800,000	$5,500,000	$32,300,000	$4,100,000	$36,400,000

TABLE II—DIVISION OF PROPOSED CHICAGO SUBWAY COSTS ON BASIS OF 35 PER CENT ASSESSMENT ON BENEFITED PROPERTY

		—Amount Payable by—		
	Total Structure	Special Assessment 35 per Cent	Traction Fund 65 per Cent	Operating Equipment Payable by Transportation Company
State Street..........	$20,950,000	$7,332,500	$13,617,500	$3,000,000
Washington-Michigan-Jackson............	11,350,000	3,970,500	7,377,500	1,100,000
	$32,300,000	$11,305,000	$20,995,000	$4,100,000

governmental control as to rates of fare and as to extensions is the one most important factor in the entire field of urban transportation. They also are convinced that such consolidation is a necessary preliminary to subway construction, and that the tracking of rapid transit trains in the very expensive subway form of construction can be justified only if those rapid transit trains operate under adequate load. This is to be had only by a consolidation and co-ordination of the entire transportation system.

The sole argument for competing transportation companies is that only by such competition can service be kept up and the price of such service be kept down. There appears to be no other argument than this, and this single argument is misleading and untrue. Under a single and consolidated company the citizen receives the maximum of transportation facilities at the minimum of cost.

A rather special argument for consolidation applies to this particular time and place. The city is in possession of a considerable "traction fund," subject to use for the extension of transportation facilities. Under consolidation the single company will support the best program of use of the traction fund, whether for trolley car or rapid transit construction. Without consolidation the competing companies can never agree on any program of use of the fund. This perhaps is not a legal, but is a very practical, difficulty in planning and conducting any program of new construction. For these reasons, states the report, it is recommended that the appropriate steps be taken toward effecting a consolidation of the Chicago Surface Lines and the Chicago Rapid Transit Company.

REASONS FOR SPECIAL ASSESSMENTS

The argument for the special assessment is that while the subway is a public improvement, it is a local benefit and will tend to increase property values in the Loop district disproportionately to those in outlying territory. Some questions exist as to the constitutionality of a special assessment. The constitution of Illinois permits local improvements by special assessment or by special taxation of contiguous property or otherwise. Several court decisions have interpreted this to mean that if a common improvement is more than 50 per cent local such assessments can be made, but if the local benefit is 49 per cent or less the improvement does not come within the scope of the constitutional provision.

Two alternatives are apparent: First, attempt to get a court decision that 51 per cent or more of the proposed benefit arising out of the construction of the new subway units will constitute a local improvement. The subway advisory commission recommends 55 per cent. If such a decision is not forthcoming, or the local benefit appears to be less than 50 per cent, a special assessment would be unconstitutional. The only alternative would be to obtain an amendment to the State Constitution.

PHYSICAL CONSTRUCTION RECOMMENDED

The major recommendations of the commission are for two subway units. The one in State Street is to be used exclusively for rapid transit trains and will extend from Chicago Avenue and Franklin Street on the north to Roosevelt Road on the south, connecting with the present elevated structure of the Chicago Rapid Transit Company at either end. The second proposed subway is a loop on Washington Street, Michigan Boulevard and Jackson Boulevard, extending under the south branch of the Chicago River in two existing tunnels and coming to the surface on the west side of the river. The Washington-Michigan-Jackson subway loop is purely to facilitate the movement of the west side surface lines. This is contemplated as a low-level loop passing under the State Street rapid transit subway. As this subway would have two tracks an extensive overhead passenger concourse is not essential, although considered desirable by the commission. In the case of the four-track State Street line, necessitating steps or means of elevation from the two center platforms at each station, a passenger mezzanine is considered a necessity.

EXISTING FACILITIES ARE USED TO THE MAXIMUM

The north and south sides of Chicago will benefit by the rapid transit facilities afforded in the State Street subway. The west side will benefit directly and indirectly in that most of the existing Loop elevated facilities will be available for west side service, and in addition west side surface cars will have quick and unobstructed movement in and out of the business district.

In order that the traffic on the two legs of the surface car subway may be balanced, switching facilities are provided where each leg intersects Michigan Boulevard, so the service on one leg can be switched back if desired without negotiating the entire loop.

TABLE III—PERSONS ENTERING BUSINESS DISTRICT OF CHICAGO, WEEK-DAY AVERAGE, 1924

		Number	Per Cent
Trolley cars (Chicago Surface Lines)......................		390,000	33.00
Passenger vehicles..................................		234,735	19.88
Rapid transit trains (Elevated).........................		204,000	17.25
Pedestrians			
From north side............................	38,203		
From west side*............................	65,871		
From south side............................	76,979	181,053	15.31
Motor buses..		74,000	6.26
South side railroad stations			
La Salle Street............................	25,402		
Illinois Central............................	23,214	58,616	4.96
Motor trucks, etc............................		34,535	2.92
Chicago, Aurora & Elgin..................................		5,000	0.42
Total....................................		1,181,939	100.00

*Passengers coming from the west side railroad stations are included in "Pedestrians" from the west side.

Because the surface car subway on Washington, Michigan and Jackson has its loading platforms 35 ft. below the street level, escalators are planned for each of the eight stations contemplated. Three of these stations will be on Washington Street, two on Michigan Avenue and three on Jackson Boulevard. The escalators will lift the passengers from the station platform level to a mezzanine. Passengers may use this mezzanine or sub-service sidewalk for some distance and emerge to the street level through any of several short flights of steps. The exact extent of the mezzanine over this subway is not as definitely determined or recommended as in State Street.

As transportation facilities are further developed, this surface car subway can be used for rapid transit trains if desired without change in structure.

STATE STREET MEZZANINE AN IMPORTANT FACTOR

The mezzanine level under State Street and above the subway cars is contemplated for the entire length of the four-track section. From this mezzanine, steps will connect with each of the three stations. The commission recommends that the mezzanine be extended between stations in order to make a complete lower concourse for pedestrians, and suggests that until the entire street width of such a mezzanine be required for pedestrian use, it can be "limited to one broad trafficway or concourse down the center of the street. The remaining space on each side of the concourse and adjoining the basements of the abutting properties can be licensed to the owners of those properties for retailing or other similar use."

Under the east and west sidewalks at each cross street this mezzanine would extend in narrow passageways for a block either side of State Street. Thus the entire area from Dearborn Street to Wabash Avenue and extending from Randolph to Polk Street would have a complete pedestrian level free from all kinds of interfering traffic. Short flights of stairs would lead to the street level at any of the intersecting points. Stores and buildings would provide subway entrances, and in the words of the commission's report,

> it will act as a direct, convenient, and comfortable clearing house for the incoming and outgoing passengers of the north and south rapid transit system. But it will do much more. It will act as a direct, convenient and comfortable passageway from one end of the downtown district to the other. The pedestrian will walk along a brilliantly lighted corridor, lined with attractive show windows, unvexed by vehicular cross traffic, unaffected by weather. The entire street will be put under a single roof —not at the twentieth floor level, but at the basement level. The merchandise of the greatest merchandising district of the world will be concentrated on and made accessible to a single concourse—a world's fair, continuous and perpetual.

The commission elsewhere states: "The above described mezzanine pedestrian level or concourse is counted upon, in the minds of your advisory commission, materially to aid the financing (in part), by special assessment, of the proposed subway. The sum raised by special assessment from abutting property owners alone would doubtless pay for the entire cost of the mezzanine pedestrian level or concourse and constitute in addition some payment toward the cost of the train level."

ELEVATED EXTENSIONS

Two elevated extensions are cited in the report, one to connect up the present structures on Ashland Avenue, the second an extension of the present loop on Wells and Polk Streets. The purpose of this latter is to extend the present loop area and to avoid congestion. The cost of these two loop extensions the commission believes should be financed on the special assessment principle, but does not take it into account in its final consideration of costs, which are confined to the two subway units alone.

Table I gives the cost of the two subways summarized into three general headings of train level, pedestrian level and operating equipment. Table II shows the method of allocation, on the assumption that only 35 per cent ultimately would be raised by special assessment. The per cent is assumed for illustration only.

The commission recommends that the subway structures be built in their entirety from special assessments, contributions and the traction fund. For operation they should be turned over to a consolidated company, franchised to perform the work of transportation. The rolling stock would be purchased by the operating company. The rental for the use of these city-built facilities should be moderate, but need not be negligible. While considered beyond the scope of its assignment, the commission ventures the suggestion that "without the slightest authorization" perhaps a sum of $5,000,000 could be raised as advance rental payment, discounted for a number of years ahead.

Bus Operating Statistics Compiled by California Commission

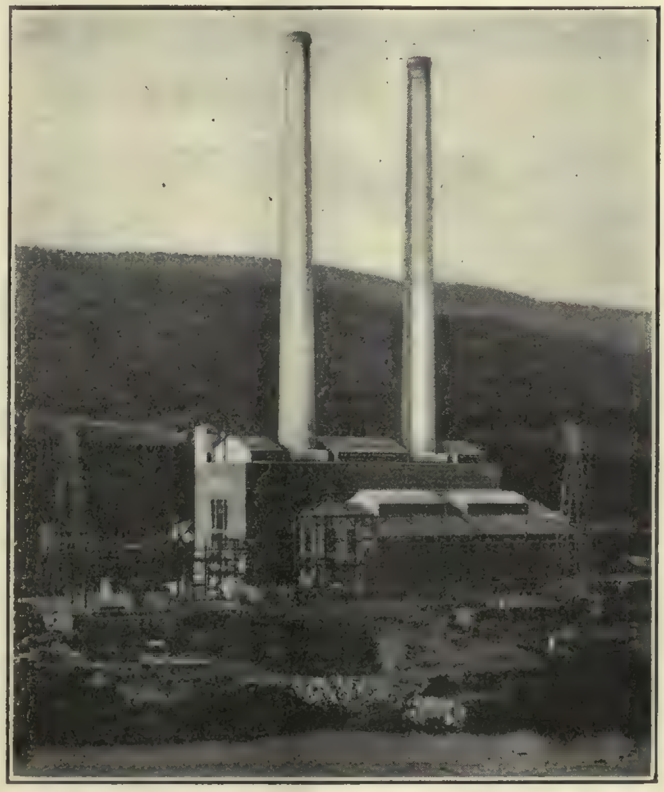
NEARLY 30,000,000 passengers were carried during 1924 on the motor buses in California, according to the report of the Railroad Commission of California for the year ended July 30, 1925, just issued. In detail, 27,727,477 passengers were carried by Class A companies or those whose gross annual income was more than $20,000, while the smaller companies carried 1,935,431.

Gross operating revenue of all the companies in 1924 amounted to $19,042,161, as compared with $17,554,981 in 1923. Operating expenses in 1924 were $18,231,526, leaving a net revenue of $810,635. One of the principal items of expense reported by the motor bus lines, which included both passenger and truck operators, is for gasoline. In 1924 the Class A companies paid gasoline bills totaling $1,295,816, while the gasoline bills of the smaller companies totaled $365,053. Class A companies paid federal income taxes of $79,629. All other taxes amounted to $528,995, a grand total of $608,624. Class B companies paid taxes amounting to $76,980.

The equipment reports of the Class A companies showed a total of 1,188 passenger buses, 1,117 trucks and 520 other vehicles, the latter being principally trailers. The Class B companies in 1924 used 537 passenger buses, 544 trucks and 24 other vehicles. This makes a total of 2,930 pieces of equipment regularly devoted to the business of transporting persons and property over the highways, as public carriers. This figure does not include peak equipment. A large percentage of the auto, stage and truck operators, at time of peak demands, lease equipment to enable them to take care of the traffic. This practice is approved by the commission, which prescribes the form of lease. Including leased cars, approximately 4,000 cars, trucks and trailers are required to meet the demands of travelers and shippers who use the public highway transportation service in California.

Virginian Railway Operates Power Plant

The 134-Mile Electrification from Mullens, W. Va., to Roanoke, Va., Is Supplied from a 40,000-Kw. Plant at Narrows, Va.—Pulverized Coal Used to Supply Steam for Four Turbo-Generators—Precautions Taken to Insure Continuity of Service



The Narrows Power Plant of the Virginian Railway Has Excellent Facilities for Obtaining Fuel and Water, Being on the New River in the Heart of the Coal Region

ELECTRIC haulage of coal trains, recently inaugurated by the Virginian Railway, requires the heaviest concentration of power on a moving train ever undertaken. The electrification will extend from Mullens, W. Va., to Roanoke, Va., a distance of 134 miles, and will include the heavy grade portion of the railway where it crosses the Appalachian Mountains.

The maximum yearly capacity for which apparatus is installed is 12,500,000 tons of coal, or 17,500,000 gross tons (cars and lading eastbound, with a small additional amount of manifest tonnage). The system is laid out to take care of a maximum day's traffic of 60 per cent above the average.

A steam power plant has been built for this operation on the New River at Narrows, Va. The selection of site was determined by considerations of an adequate supply of condensing water, nearness to center of gravity of load, suitability from the physical standpoint, and that of housing the operating forces. It contains four turbo-generator units, having a continuous rating of 10,000 kw. at 80 per cent power factor, with five 1,521-hp. cross-drum boilers, equipped to burn pulverized fuel. The power house is designed to permit of extension ultimately to include seven turbo-generator units and nine boilers.

The power plant building is constructed of brick and concrete. The boiler room is 217 ft. long, 62 ft. wide and 91 ft. high, giving room for six boilers, five of which are installed. The boiler ash pits, pulverizing mills and feed water heaters are located at ground level. A mezzanine gallery, 23 ft. above the lower floor, provides space for the pulverizer exhausters, the feeder blower fans and future coal-drying units. The main operating floor is located 36 ft. above the lower floor. A mezzanine gallery is located at the rear of the boilers, 12 ft. above the main operating floor, and provides access to the rear of the boilers for the removal and replacement of tubes. The electrical bay has two floors above the ground level and provides space for the high-tension bus and switch gallery, the switchboard control gallery, a machine shop, tool room, storage battery room, toilets, and administrative offices.

The relative areas required are shown in the table below. All allowances, including space for pulverizing units, are included.

A basement under the turbine room and electrical bay, 32 ft. below the ground floor, provides space for condensers, circulating pumps, condensate pumps, boiler feed pumps, house service pumps, filtration plant and storage space for plant supplies. A mezzanine gallery 18 ft. below the ground floor provides space for possible future reactance coils for the main turbo-generators and for a 440-volt switch gallery.

The two reinforced concrete stacks are 25 ft. 8 in. outside diameter at the bottom and 16 ft. inside diameter at the top, and rise 285 ft. above the concrete footings, making a total height of 376 ft. above the bottom of the ash pit.

The plant has been designed for the use of "bone" coal, with provision for burning high-grade bituminous coal from the mines served by the Virginian Railway, or a mixture of the two. The total annual net output of the plant should be approximately 120,000,000 kw.-hr., and the average daily fuel consumption will be approximately 390 tons of "bone" coal, 275 tons high-grade bituminous, or 320 tons of a 50 per cent mixture.

	Area, Sq.Ft.		
	Total	Per Boiler-Hp.	Per Rated Generator Kw.
Ground area of boiler house building	13,500	1.77	0.34
Floor area of boiler house..........	32,800	4.3	0.82
Floor area of turbine room..........	11,500	....	0.29

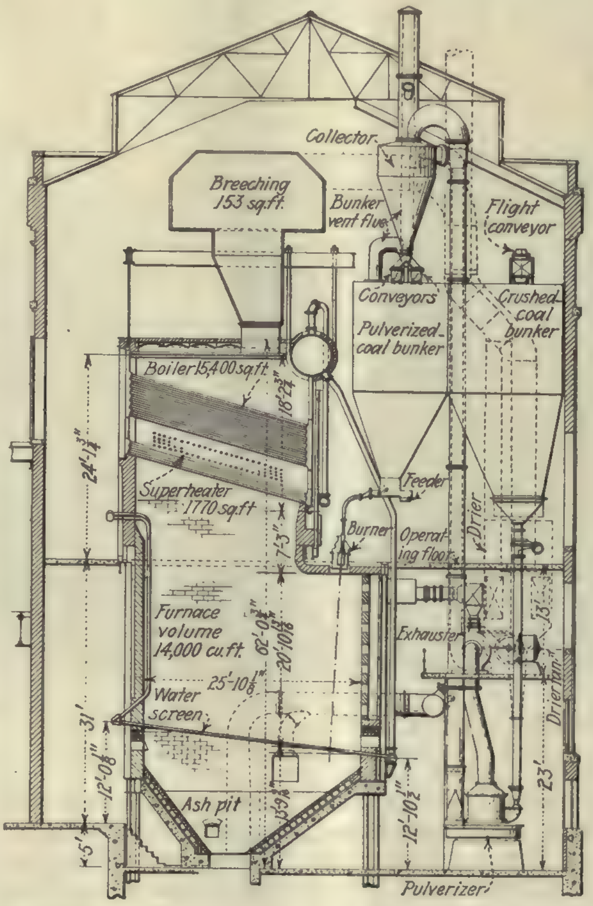
A coal siding is provided for storage of 25 to 30 cars leading to a track hopper, which will receive coal either directly from cars or from outside storage. The coal-handling equipment is designed for a capacity of 85 tons of coal per hour.

The coal is first crushed and then is carried to a flight conveyor leading to six bunkers or is discharged into a chute leading to outside storage. From the bunkers the coal goes to the pulverizing equipment on the lower boiler room floor. Screw conveyors deliver the pulverized coal to bunkers.

Boilers are of the cross-drum horizontal water-tube type, built for 325 lb. pressure. They are arranged in a single row, with independent settings extending from the lower boiler room floor upward 62 ft. to the top of the boilers. An operating gallery is located 36 ft. above this lower floor and is so arranged that the operating forces have complete control of the boiler operation from one level.

The superheaters are of the inter-deck design, built for pressure of 320 lb., each having 1,770 sq.ft. of heating surface. They give 150 deg. of superheat when the boilers are operating at 160 per cent of rating.

The pulverized fuel is introduced into the furnaces by a screw feeder to ten burners so mounted as to feed it vertically into the boiler at the top of the furnace. Air at a pressure of 15 in. of water is admitted at the feeder outlet, and serves as a vehicle for carrying the finely divided coal into the furnace and imparting sufficient velocity to project it to the bottom of the furnace. The greater portion of the total air for combustion is induced by natural drafts through the air inlets at the front of the furnace at right angles to the vertical stream of coal. The flame travels downward until the lower zone of the furnace is reached, at which point the downward velocity is lost, and the flame doubles back on itself and flows upward at the rear of the furnace to the boiler heating surface, thus giving it a travel of 50 ft. and allowing sufficient time for complete combustion in the furnace proper. The refuse resulting is a finely divided granular ash, which is carried away by a sluiceway into the river.



Compactness in the Boiler Room Is Obtained by Increasing Its Height. Arrangements for Firing Pulverized Coal Should Be Noted

The automatic control for regulating the supply of fuel and air is actuated by the steam pressure. A falling pressure operates a motor-driven contactor, increasing the flow of coal and air, while a rising pressure reduces it. The master contactor may be by-passed and hand push-button control substituted when desired.

FOUR TURBO-GENERATORS ARE INSTALLED

Four main turbo-generator units have been installed, each of 10,000-kw. capacity, 25 cycles, three-phase, 11,000 volts, having direct-connected exciters. The turbines are of parallel flow type, operating at 1,500 r.p.m. at 275 lb. steam pressure and 150 deg. superheat. They are guaranteed for a maximum economy of 12.48 lb. of steam per hour, when delivering 10,000 kw. at 80 per cent power factor, and with a vacuum of 29 in. The turbines are connected through a pin-type flexible coupling to the generators, each of which is designed for a continuous full-load rating of 12,500 kva. at 80 per cent power factor, and will carry, following continuous full-load operation, a load of 15,000 kva. at 80 per cent power factor for one hour, and 18,750 kva. at 80 per cent power factor for five minutes following the operation at 15,000 kva., without exceeding a safe operating temperature. A 125-kw., 250-volt direct-connected exciter is mounted at the end of each generator.

The 300-kw. auxiliary turbine is of the impulse type and is direct connected through a reducing gear to a three-phase, 440-volt a.c. generator, a 100-kw., 250-volt d.c. generator and a small d.c. exciter. The 440-volt a.c. generator supplied power for the operation of the auxiliary equipment during the starting up of the power plant and is available for special service during regular operation. The 100-kw. d.c. generator can supply excitation to any one of the main units in the event of failure of the direct-connected exciters.

Each turbine has a surface condenser, with circulating water pump, a two-stage air ejector, and a condensate pump. The condensers are of the two-pass type. For the operation of the condensers, 20,000 gal. of water per minute is supplied through an intake tunnel taken from the upstream side of the power plant.

One phase of each generator is connected to the primary of a 10,000-kva., single-phase, 9,800/88,000-volt step-up water-cooled transformer. A three-phase, 11,000-volt bus is provided for synchronizing and for supplying power to the station auxiliary transformers. Each step-up transformer secondary is connected through an oil circuit breaker to the 88-kv. bus, which is divided into two sections with two step-up transformers connected to each.

The electrical operating gallery contains the necessary control devices. A small balcony projecting into the turbine room allows a view of the turbine room and provides space for the power director's desk in front of the control bench board. The main control and instruments are arranged on seven desk and vertical panels facing north, and the main relays and watt-hour meters on seven corresponding vertical panels facing south.

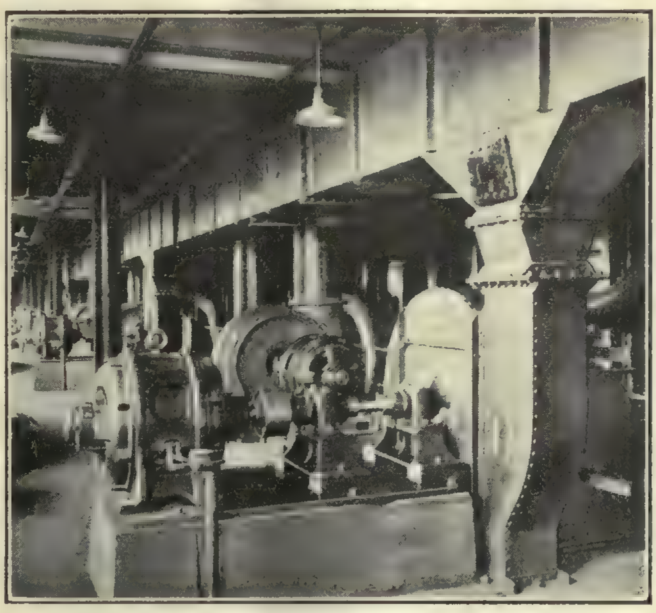
An independent rheostatic type voltage regulator is provided for each generator, the regulator receiving potential from a generator potential transformer being connected across the traction phase. The regulators are compensated to give a drooping characteristic with increase in generator wattless current, insuring parallel operation, and to give a rising characteristic with increase of watted component of generator current, compensating for drop due to step-up transformer impedance and for part of the transmission line drop.

The three auxiliary transformers are connected to the 11,000-volt bus and are each 1,200-kva., 11,000/440-volt three phase. The entire load can be carried by two transformers, leaving the third in reserve. A further source of auxiliary power is the 300-kw., 440-volt, three-phase turbine-driven generator previously described.

The 11-kv. oil circuit breakers and the 88-kv. transformer oil circuit breakers are not automatic on overload. Protection against internal fault in any generator or transformer of 1,200 kva. or larger is accomplished by differentially connected current transformers and over-current relays. In case of generator or step-up transformer internal fault, the connections are such as to open simultaneously the generator 11,000-volt oil circuit breaker, the generator field circuit breaker and the transformer 88-kv. oil circuit breaker. Internal fault on one of the 1,200-kva. transformers will open simultaneously the 440-volt and the 11,000-volt auxiliary transformer circuit breakers. Internal fault on one of the 3,750-kva. step-down transformers will simultaneously open the tie circuit breaker and the 88-kv. circuit breaker connected to that transformer.

A 220-ohm resistance connected between the step-up transformer neutral bus and ground limits to 200 amp. maximum the current in case of a grounded transmission line. Each 88-kv. transmission line oil circuit breaker is opened automatically in case of a ground on its line by a low-energy over-current relay so connected in the current transformer secondary circuits as to receive current only in case of ground. Over-current relays open the 88-kv. transmission line circuit breakers in case of transmission line short circuit.

The water rheostat circuit breakers and the 88-kv. circuit breakers feeding the step-down station have short circuit protection by over-current relays.



A Part of the Pulverized Fuel System, Showing Blower for Supplying Air to the Burners

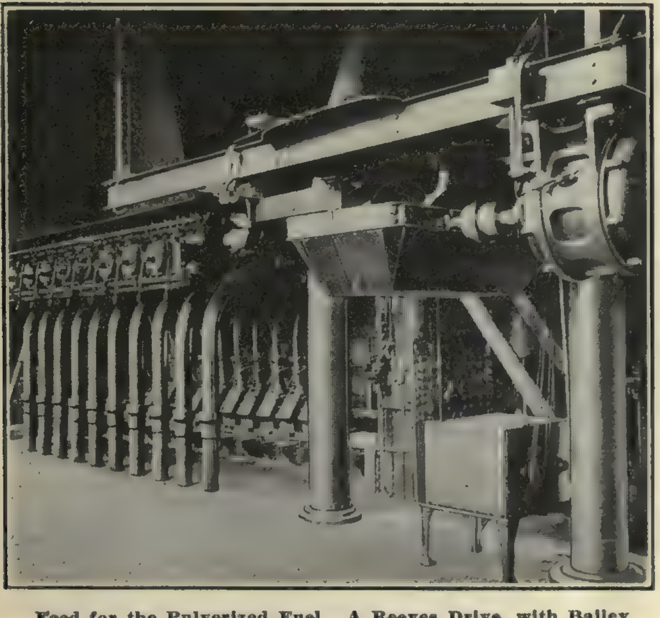
Excessive temperature, failure of water supply, or pressure relief diaphragm failure on any transformer will ring a bell on the electrical operating gallery and operate an annunciator drop, indicating which transformer is involved.

The outdoor transformer and switching station includes auxiliary and lighting transformers, main step-up transformers, and the 88-kv. transmission line lightning arresters. It also includes the step-down transformers for feeding the trolley at Narrows and the necessary switching equipment. There are duplicate 88-kv. electrolytic lightning arresters, one for each pair of transmission lines.

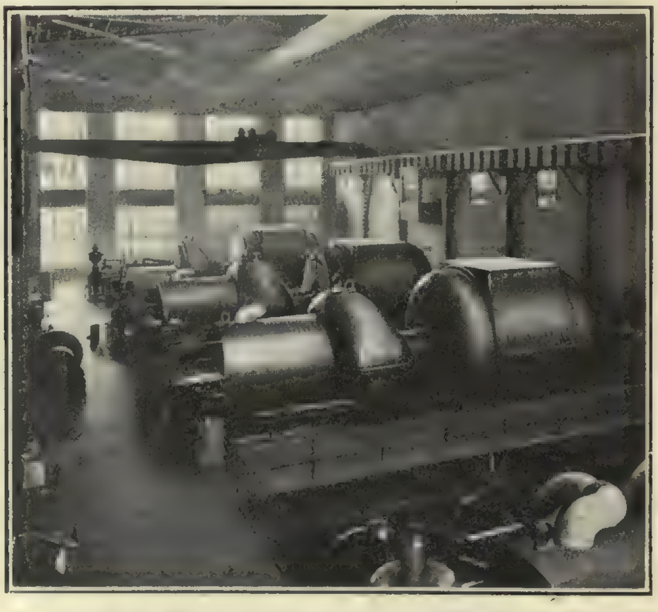
The four main step-up transformers are 10,000 kva., 9,800 to 88,000 volts, 25 cycles, single phase, oil insulated, water cooled. An additional full capacity tap gives a ratio of 9,310 to 88,000 volts. They are designed to carry 200 per cent load for five minutes following 150 per cent load for one hour without exceeding safe temperature, and will withstand without damage a short circuit on the secondary terminals with normal voltage maintained on the primary terminals, providing the duration of the short circuit is not sufficient to cause injurious heating. Each transformer has an inherent reactance of approximately 8 per cent at normal rating.

The station auxiliary transformers are each 1,200 kva., three phase, 25 cycle, 11,000/440 volts, oil insulated, water cooled. The primary winding is provided with eight additional full-capacity taps ranging in 2½ per cent steps above and below 11,000 volts. Each transformer has an inherent reactance of approximately 12.2 per cent at normal rating.

The electric locomotives used are of the split-phase type and provide automatic change from motoring to



Feed for the Pulverized Fuel. A Reeves Drive, with Bailey Control of Speed of Burners and Draft

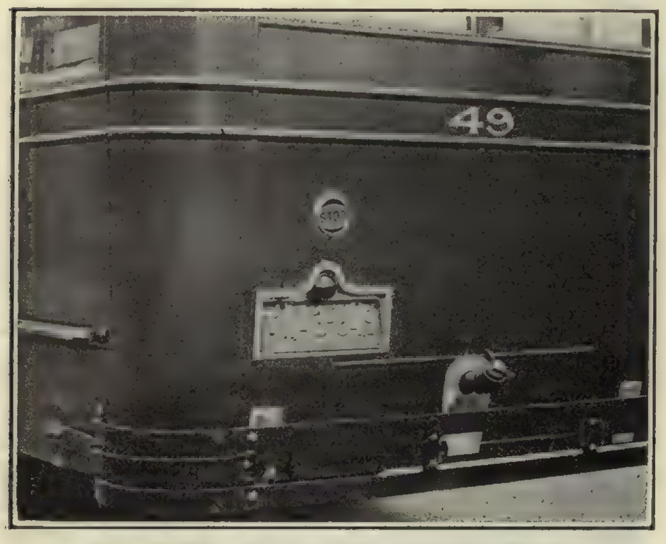


Four 10,000-Kw. Turbo-Generators Are Installed in the Narrows Plant and Space Is Provided for a Fifth regeneration as the grade changes, without action of the engineman other than a movement of a lever operating the transformer balancing switch. The regenerated power is returned to the substations and finally to the Narrows power plant, where any excess is absorbed by a water rheostat consisting of electrodes immersed in the river.

The electrical apparatus was furnished by the Westinghouse Electric & Manufacturing Company as a part of its general contract for apparatus for electrification of the railway. The power plant was designed and constructed by Gibbs & Hill, consulting engineers of New York City, as a part of their work as engineers of the electrification, under the general supervision of H. Fernstrom, chief engineer of the Virginian Railway, and Hugh Pattison, engineer of electric traction.

Many New Features on Youngstown Municipal Coaches

RECESSED number plates, such as are now required in certain states, are used on the latest coaches to be put in operation by the Youngstown Municipal Railway. A cast aluminum frame is set in the body, as shown in the illustration, reproduced herewith, into which the standard license tag is fastened at a slight angle with the vertical. The tail light, just above, has its lower part covered with a flexible transparent strip that allows the plate to be fully illuminated at night. In this way the tail light and plate are not exposed to damage from rear-end collisions. The rear bumper, constructed of spring steel, is adequate protection against minor rear-end collisions.



New Features Protect Against Rear-End Bumps

New Youngstown Municipal coaches have recessed number plates, combined with tail lamps. A guard rail at the side protects against damage due to sidewiping in traffic. Wire glass is also used in the two rear windows, so they will not shatter in case of a serious collision.

At the side is seen the end of a small steel rail designed to protect the aluminum panels from damage due to sidewiping. Before these rails were added it was almost impossible to avoid scratched or dented plates. While the last lot of ten coaches delivered this year were constructed in this manner, the old coaches are being rapidly equipped with these rails.

The two rear windows are also set with wire glass to avoid shattering in case of a serious rear-end collision.

Women Employees Can Be Helpmates in Utility Organizations

By Alice Schuetze
San Antonio Public Service Company, San Antonio, Tex.

SEATED behind a polished desk and answering to the name of "manager" or "superintendent," a well-dressed young woman is a bit out of the ordinary, isn't she? The fact that women liked business, were making a success of it and were there to stay has been hard to recognize. It seems as though a new discovery has been made. Women in public utility work can fill many positions other than those of typists and stenographers. Of course, they will always make the best typists, but why not utilize their natural abilities to bring more far-reaching results?

There is a plan in effect in some companies whereby all women in the utility companies are organized. They are taught the standards and policies of their company. They are made thoroughly familiar with their company and are able to tell the public about one and two man operated cars, the use of buses, costs of operation and many details regarding schedules. They are taught to speak distinctly and courageously and, after learning their lessons, to use their natural ability to talk and spread their knowledge of their company to public gatherings.

They are sent to schools and to make talks to the children on safety of riding to school on street cars and buses. They are sent to mothers' clubs and civic organizations, where they stress the points of economy and cleanliness as well as safety of our common carriers to the mothers. What mother will not listen to a talk about anything safe and reliable as well as economical, especially if it is in the interest of her children?

We hear a great deal about traffic congestion. Women are easily impressed, so what better plan could be devised than to reach them through their clubs, their schools and their civic organizations and impress upon them the value of leaving their autos at home, or at least on a side street where there are no street cars, when they do their shopping? Show them the reason for so many accidents, to say nothing of the loss of time and money, by parking in front of retail stores. Incidentally, who but a wife could persuade friend husband to do likewise?

Education costs money, and it will take time before the plan for placing the woman employee before the public can be successful. There is the chance of our women leaving the industry for marriage, which seems a loss of time and money to some of the officials. But it cannot be a total loss, for they will continue to carry the message on to their neighbors, their club members, their families and their friends. Women are realizing the responsibilities of their positions more every day and are no longer feeling as if they were working for their manager, but rather with him for their company. This makes each of them proud of her position, anxious to become a better employee, and consequently bring about better co-operation among the employees as a whole.

The organization of women is young and inexperienced. Some managers are skeptical and will not even try out the plan. The only suggestion that can be offered is to give it a fair chance, help it along and the company will be returned threefold for its patience and its expense.

On our property in San Antonio the women's work is being given more than a chance. It has the encouragement of all the officials as well as the full co-operation of all the girls. So far the most important accomplishment has been to educate them through lectures by various department heads. Many questions have been asked and essays written by the girls. At one of our meetings five young women prepared five-minute talks on "What I consider the best way of increasing street car riders," thereby getting a woman's view of what was needed to gain revenue. At this meeting the officers of the transportation department were present and later remarked that every idea was practical, as well as new.

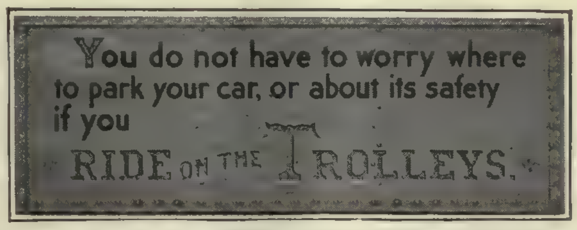
It has been only recently that the women of our company have been placed before the public as spokesmen for the company. We have a representative in the largest professional women's club in the city. A very successful pageant of "Fifty Years of Progress" was given to some 500 employees. A dialogue between a company clerk and an irate customer is being proposed and is nearly ready for presentation.

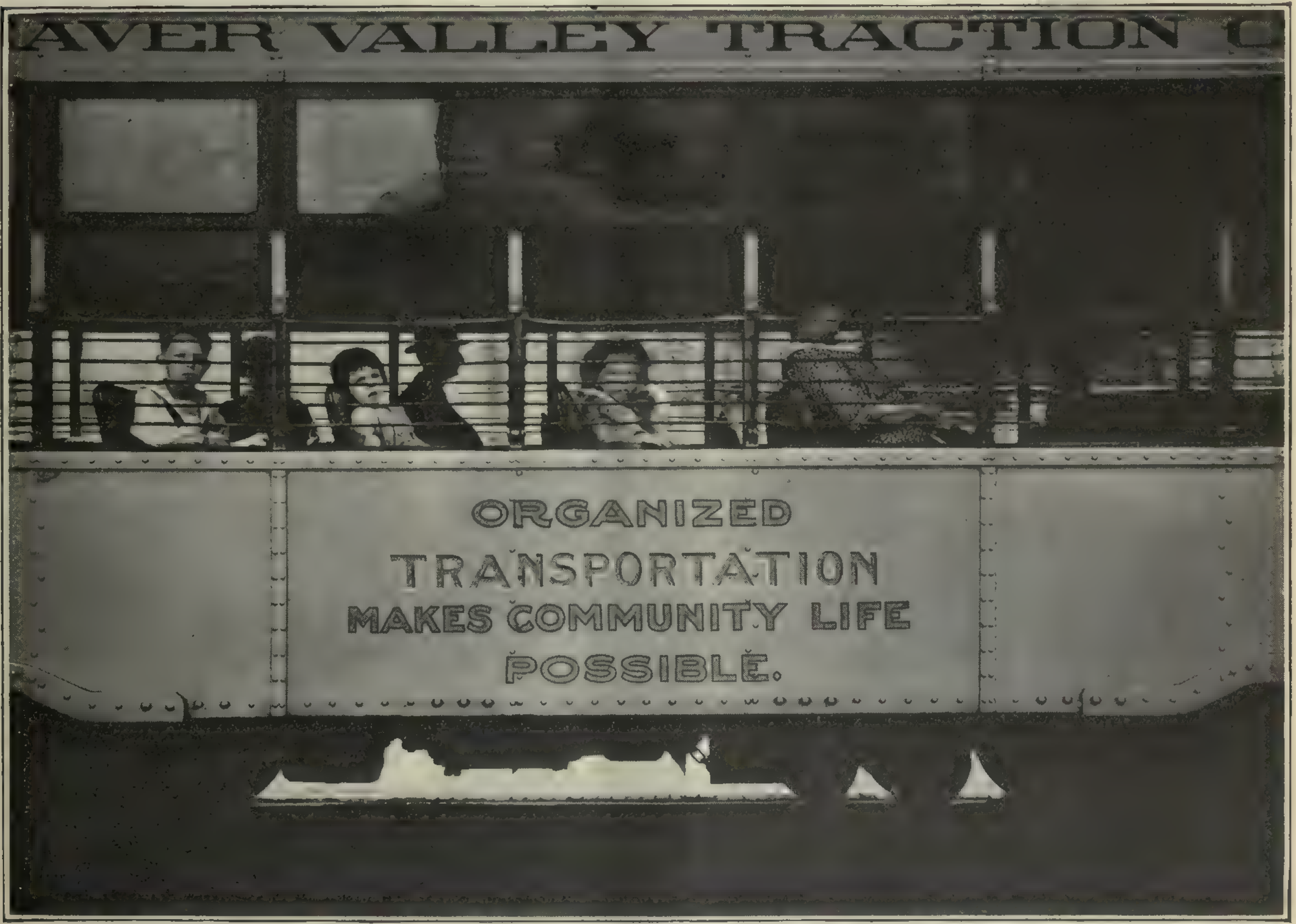
Within the next few months the company is planning to send more women to speak before clubs. A course in public speaking has just been completed which helped a great deal, and in the fall we plan to continue this work in preparation for a more extended contact with our patrons.

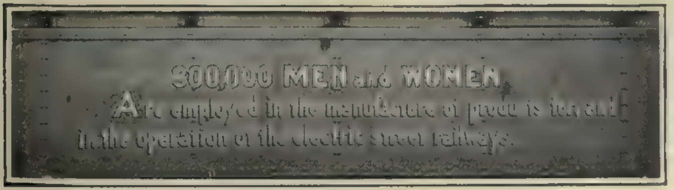
Some one has said that a chain is as strong as its weakest link. Strengthen the women employees and better relations with the public will certainly result, since women form one of the greatest group of our street car patrons. Satisfy your women patrons by letting a woman employee tell the company's story.

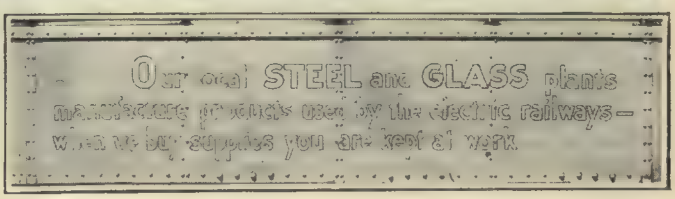
Beaver Valley Traction Again Employs Advertising Slogans

THE opportunity open to all traction companies to employ the most direct of all possible advertising mediums, namely, the trolley cars themselves, has again been recognized by the Beaver Valley Traction Company, New Brighton, Pa. The accompanying illustrations show the various slogans which the company has painted on its cars in order to educate the public to a realization of the indirect, as well as the direct, value of the company's service.


You do not have to worry where to park your car, or about its safety if you
RIDE ON THE TROLLEYS.




300,000 MEN and WOMEN
Are employed in the manufacture of products used in and in the operation of the electric street railways.

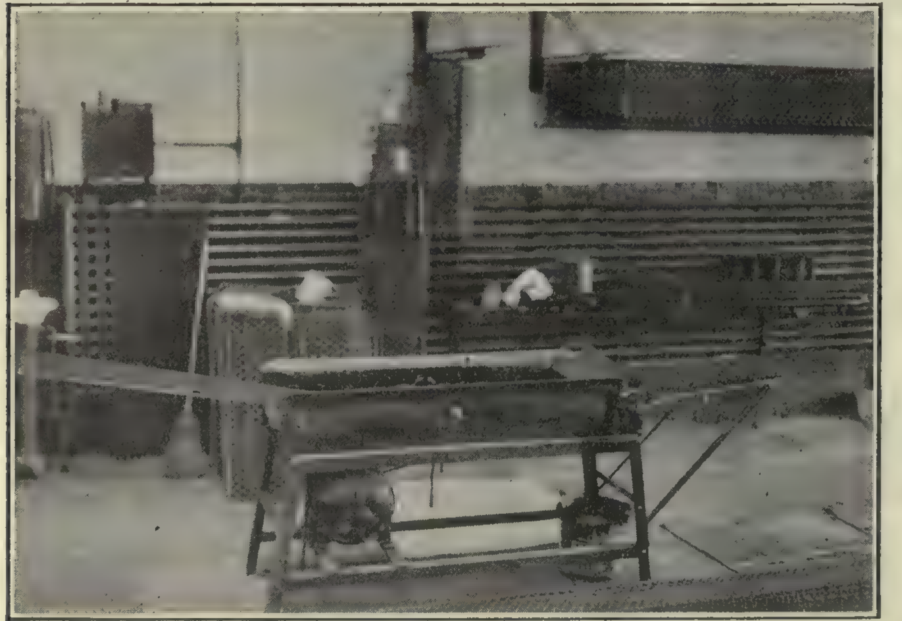

Our local STEEL and GLASS plants manufacture products used by the electric railways— when we buy supplies you are kept at work

Maintenance Notes

Window Guards Painted by Machine in Cleveland

PAINTING heavy wire mesh window guards always was a messy job in the Cleveland Railway shops until Terence Scullen, master mechanic, developed a simple device to do this quickly and completely. As can be seen in the view, a trough is partially filled with black paint. The window guard to be painted is pushed by hand into the left end of the trough and under a roller, the support of which can be seen in the center of the trough. This bends the guard down slightly, dipping it into the paint. The guard is then pushed beyond this roller and it strikes the sloping bottom of the tank, bending it upward and between two brushes at the right-hand end of the tank. Theses brushes are revolved rapidly by means of a motor mounted underneath and connected to them by a belt. After the window guard is pushed partially through this device a workman grapples it on the painted side with an iron hook and pulls it through the rest of the way. The window guard is thus dipped into the paint, the surplus being brushed off as it emerges. After painting, the guards are hung up on racks for drying, as can be seen in the background.

Window guards extending the full length of the car can be painted in a few seconds by this machine.

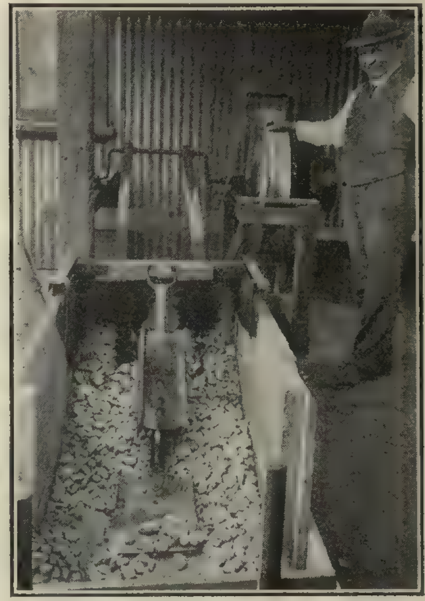

Window Guards Are Painted in a Few Seconds in the Cleveland Shops by the Use of This Paint Tank. As the Guard Emerges the Motor-Driven Brushes at the Right-Hand Side Thoroughly Brush the Paint Into All Parts of the Guard and Remove the Surplus

Testing Track Department Shovels

MANY shovels are purchased each year by the Los Angeles Railway, Los Angeles, Cal. Different types are offered by the various manufacturers, so in order to decide the best type for the railway company's use, a machine for testing shovels has been developed. Each shovel is tested in this machine before purchases are made.

The shovel-testing machine consists of a bin of heavy planking, with a slide or crosshead arranged at the top at one end. In operation this slide is given a reciprocating movement by two connecting rods attached to a crankshaft driven by belts from one of the shop line shafts. A large grindstone acts as a flywheel for this crankshaft.

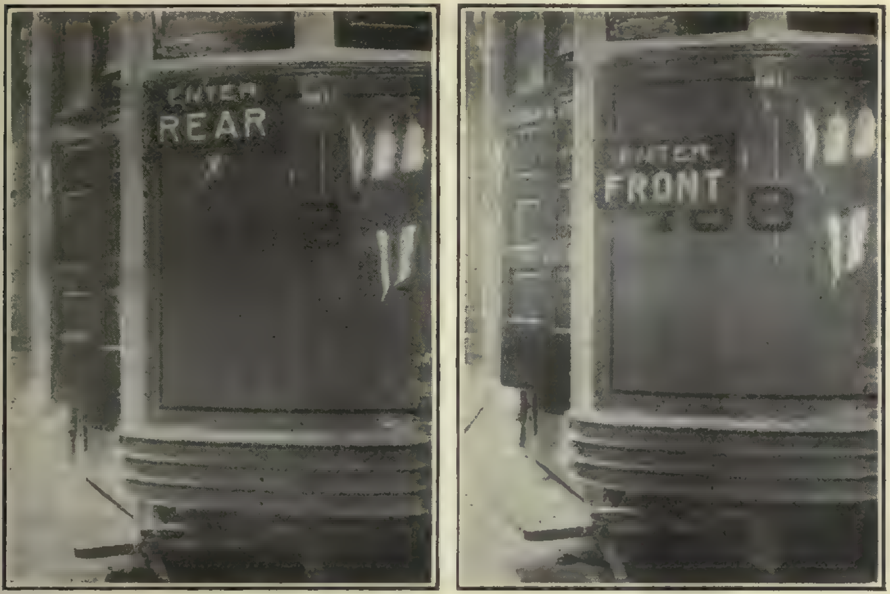
To test a shovel its handle is fastened to the reciprocating crosshead of the testing machine and a heavy piece of rail is attached securely to the handle. A quantity of loose rock is placed in the bin. The reciprocating movement of the crosshead forces the shovel into the loose rock and withdraws it in a manner similar to actual service conditions. After a shovel has been connected the machinery is set in motion and is allowed to run until the shovel breaks down in some way.


Shovel Testing Machine Used by the Los Angeles Railway

The wear on the blade is measured, and the number of hours that the shovel is on test is recorded. By this method a comparison of the merits of different types of shovels can be obtained. This machine has been used almost continuously since 1914, and tests in the field with shovels purchased when compared with the showing made by the tests in this machine have indicated that the method is very reliable.

"Enter Front-Rear" Signs

AS THE cars of the Springfield Street Railway, Springfield, Mass., are operated over various types of routes, embodying both heavy and light traffic and under one and two man operation, it was considered desirable to develop a simple sign which would inform the patrons whether entrance to the cars should be by front or rear doors. Accordingly, a metal sign has been mounted on supports placed on the right sides



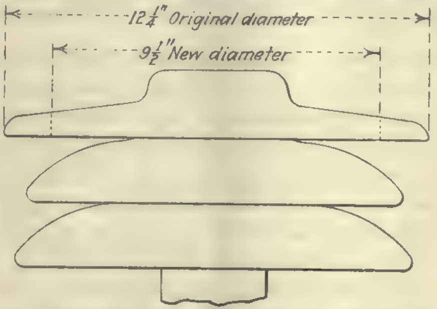
The Two Positions of the Signs Are Shown Here, Together with the Messages Which the Positions Convey

of the dashers. When the sign is in the down position it indicates that entrance shall be by the front door and when in the up position the opposite is true. A clip is provided to hold the sign in the up position when desired.

The signs are painted with yellow lettering upon a black background, thus being of a sufficiently arresting nature to attract the attention of patrons. Stencils are used for the painting, after which the signs are finished with a coat of protecting varnish. All of the cars on the Springfield system are equipped with holders for these signs, excepting, of course, the open cars, which are used only in the summer and to which the injunctions "Enter Front" or "Enter Rear" would be inapplicable.

Preventing Water Grounds on Insulators

FOR insulation at the operating potential used by the New York, Westchester & Boston Railway of 11,000 volts, the cable running from the pantograph trolley to the car transformer is supported on double petticoat insulators. The maximum diameter of these insulators is 11½ in. A metal cap at the top is 12¼ in. in diameter so that it extends over the edges of porcelain. Some trouble was experienced during heavy rains from grounding due to the water running in a continuous stream from the metal cap to the car roof, the distance from the edge of the cap to the supporting base on the roof being about 7 in. Troubles from this source have been overcome by turning off the edge of the metal cap so as to reduce its diameter to 9½ in. With the reduced diameter of the cap the water drips down onto the insulator and the stream is broken before it reaches the roof, so that grounding is prevented.



By Reducing the Diameter of the Metal Cap Used with Double Petticoat Insulators for Supporting High-Tension Cables on Its Cars, the New York, Westchester & Boston Railway Has Prevented Grounding

Moving 576 Iron Trolley Poles

WHEN the officials of the city of St. Louis, Mo., decided to embark upon an extensive street widening program the United Railways in that city was confronted with the task of moving 576 iron trolley poles back from the curb line. In some sections of the city where streets were narrow and traffic conditions very heavy the construction gangs worked under very trying conditions. These poles were moved without interrupting the trolley service and without any serious accidents.

Tower trucks of the line department were equipped with gibs to which block and tackle were attached for hoisting and shifting the poles to their new locations. In addition to these there was necessarily a large amount of detail work which included the transferring of pole attachments, installing new feed wires and the lengthening of guy lines. The pole shifting was done on five streets and the cost to the railway was approximately $12,865. About 50 men were used during the progress of the work.

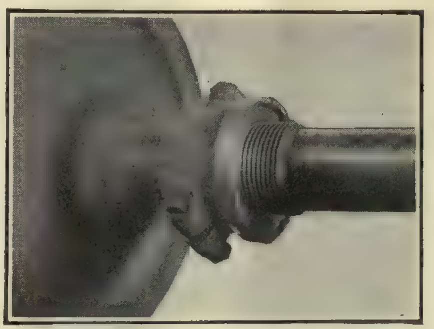
Oven Keeps Wood Stock at Gluing Temperature

STEAM heat is used in a sheet steel oven installed in the cabinet section of the Department of Street Railways, Detroit, Mich., for keeping wood stock to be glued at a temperature suitable for the gluing process. This oven was built in the company's shops. It is 6 ft. high, 10 ft. long and 6 ft. wide. One end

Sheet Iron Oven Installed in the Wood-Working Section of the Department of Street Railways, Detroit, for Keeping Wood Stock at a Temperature Suitable for Gluing has hinged double doors. Inside a pipe rack is arranged to hold different classes and sizes of wood. Not only has this oven been found convenient but it is a great time saver in facilitating the gluing, as the oven is located in the cabinet section. Pieces can be placed inside as desired and much time is saved in the gluing operation. When the work is completed a much more satisfactory job is obtained.

Threaded Axle Collar

CONSIDERABLE difficulty was experienced by the Levis County Railway, Levis, Que., with the loosening of axle collars, resulting in excessive end play of the motors. To remedy the condition H. E. Weyman, manager, and D. Chenard, master mechanic, devised the collar illustrated. The seat on the axle and the split axle collar are threaded. The collar is screwed up as tightly as needed to place the motor in alignment. Tightening the holding bolts of the collar secures it so that no loosening can take place.

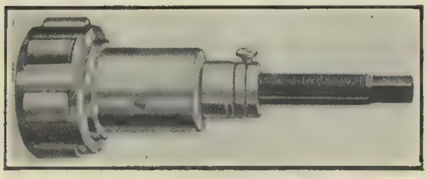


Loosening of Axle Collars Is Prevented on the Levis Tramways by Threading Them

New Equipment Available

Expanding Bushings to Provide Tight Fit

BRASS bushings and bearings in rods or housings can be inserted by a new method called the Faessler-Maupin process, which is claimed to offer an improved means over that of inserting an oversized bushing and forcing it into place. The old method is said to leave bushings soft and spongy, while the pressing frequently forces the inside hole out of shape so that reboring is necessary. The new process uses a combined expander and roller for this work, which is manufactured by the J. Faessler Manufacturing Company, Moberly, Mo. When installing a bushing by this process it is first turned on the outside to an easy driving fit or loose enough to enter the hole by hand.



Roller Type Expander Used for Applying Bushings

The hole in the bushing is bored a trifle smaller than the pin diameter on which it is to fit. Experience in the application of these bushings has shown that for a 5-in. diameter pin the hole should be bored 4$\frac{15}{16}$ in.

After the bushing is inserted in the rod the expander and roller is entered at one end to about one-half the depth of the rollers. The mandrel is turned and its construction causes it to feed lengthwise as the turning progresses. This forces the rollers outward until they bear against the inside surface of the bushing, when the mandrel will begin to turn hard. An adjusting stop on the mandrel is set against a thrust ball bearing on the cage end, which locks the mandrel so that the rollers will maintain the desired diameter. By continuing to turn the mandrel to the right the tool travels lengthwise through the entire bore of the bushing, gradually expanding its entire length. After withdrawing the tool the diameter of the roller is increased slightly and the operation is repeated for several passes until the bearing has been rolled to the desired size.

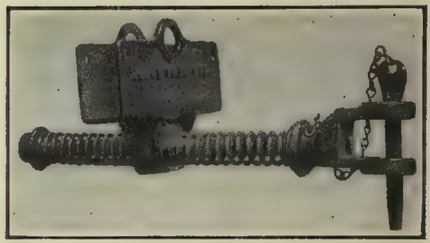
The tools provide for adjustment of size in graduated measurements of 0.0001 in. and the finished hole is said to be absolutely true both circumferentially and longitudinally and is finished with a smoothness of surface that cannot be obtained by boring. Another advantage claimed for the process is that a portion of the lubricant used in the rolling is forced into the pores of the metal. This assists in improving the operation of the bushing.

It is claimed that the gradual rolling and expanding during the process insures an absolutely tight fit along the entire outside surface of the bushing and eliminates all danger of its coming loose while in service. Tests on bushings installed by this process showed that it required pressure of 20 tons to start a brass from a 5-in. bushing.

The pressure expanding and rolling tools used in this process are made in sizes of ¾ in. up by steps of ¼ in.

Spring Drawbar for Railway Section Cars

JERKS from starting and stopping of a motor car coupled to a trailer, such as are used in section work on electric interurban lines, are eliminated by a new type of spring drawbar just placed on the market by Mudge & Company, Chicago, Ill. This drawbar was designed particularly for use with small electric motor cars and trailers. It consists of a steel bar attached to a hanger which is bolted to the underframe of the car. Surrounding the bar on each side of the hanger, back and front, is a special coil spring. When starting under load the spring compresses, giving the motor car several inches start and consequent momentum.



Spring Drawbar Designed to Eliminate Jerks and Slams

With this drawbar in use the motor car is not forced to start a heavy load from standstill, but it is moving when the load is taken hold of. The frame of the drawbar transfers the load gradually as the car gains momentum instead of with a jerk as is sometimes the case with rigid drawbars. In stopping, the spring on the other end of the drawbar is compressed, which prevents the trailer from crashing suddenly against the motor car frame.

The new spring drawbar eliminates the jerk at the start and the slam at the end of the run and so makes starting and stopping easier. It also eliminates wear and tear on the equipment. The drawbar is designed so that it can be applied to motor cars and trailers of different height, the difference in height being taken care of by changing the position of the U clamp.

American Association News

Many Cars to Be Shown

SPACE for the Cleveland exhibit is being contracted for rapidly. Yesterday Director of Exhibits Fred C. J. Dell stated that contracts have been received from 228 exhibitors for a total of 116,415 sq.ft. of space. This is far in excess of any previous exhibit held in connection with a convention of the American Electric Railway Association.

Fourteen exhibitors are arranging to show electric railway cars. Of these six are railway companies. It is anticipated that the Cleveland Railway will have an exceptionally fine exhibit.

"All car exhibitors should bear in mind the delays incident to freight shipments," said Mr. Dell. "It will be possible to place the cars in position on the exhibit tracks any time after Sept. 20, when the construction will be finished.

"In case any exhibitor desires to ship a car to arrive in Cleveland earlier than Sept. 20, I understand the Cleveland Railway will store it on the company's tracks without additional charge, and will move it into the exhibit space when that is ready. This will insure having the car in Cleveland and give plenty of time to do any necessary work to set it up and inspect it, particularly if it has required partial dismantling for shipment.

"It would not be a bad idea to have an attendant ride with the car on its railroad journey. This would insure correct routing and prevent careless handling with possibility of damage."

Mr. Dell expects to leave New York for Cleveland about the middle of September, and from that time on will be in personal charge of the exhibit. It is expected that the progress of the annex will be such that it can be turned over to the exhibit committee today, or at latest early next week.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Sept. 9—**Central Electric Railway Master Mechanics' Association, annual convention, Hotel Rieger, Sandusky, Ohio.**

Sept. 10-11—**Central Electric Traffic Association, annual meeting, Yellow Banks Hotel, Webster Lake, Ind.**

Sept. 17-18—**Mid-West Claim Agents Association, sixth annual convention, Elms Hotel, Excelsior Springs, Mo.**

Oct. 4-8—**American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.**

Oct. 10-15—**Congress International Tramway, Local Railway and Motorbus Association, Barcelona, Spain.**

Oct. 25-29—**Annual Congress and Exhibit, National Safety Council, Book-Cadillac Hotel, Detroit, Mich.**

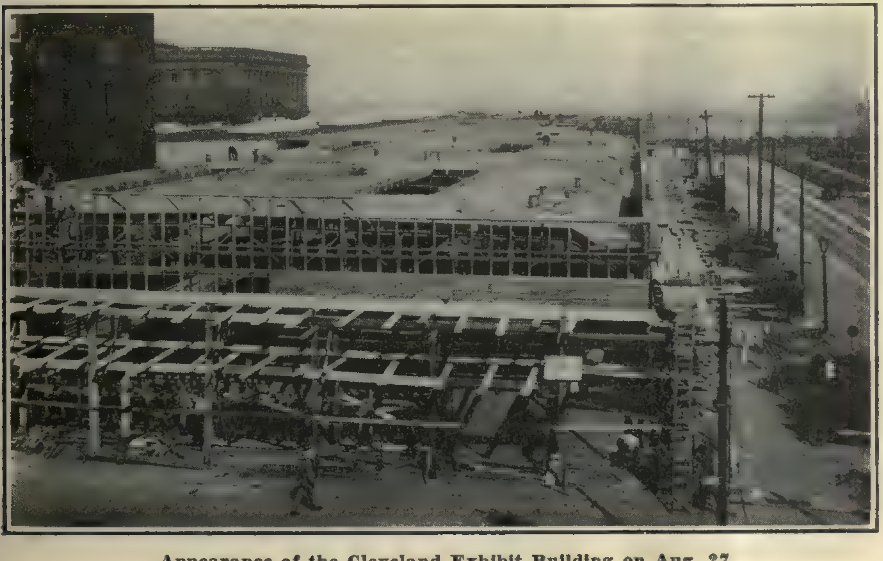
Nov. 16-18—**Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.**

November 16-19—**American Welding Society, fall meeting and International Welding and Cutting Exposition, Buffalo, New York.**

Much Progress in Cleveland Last Week

SINCE the picture reproduced in last week's JOURNAL was taken, the scene of the new exhibit building for the A.E.R.A. convention has been transformed. All the steel has been erected and the studding is all up. The roof is complete, the skylights and stucco work are 50 per cent done and 80 per cent of the floor is laid. The connection to the steam railroads is in and the Cleveland Railway tracks on the extreme right are completed and paved.

This view, taken Aug. 27, was from approximately the same point as the previous ones, but the building is now of such proportions that other exhibit facilities in the area cannot be seen.



Appearance of the Cleveland Exhibit Building on Aug. 27

Reach Cleveland Sunday

MONDAY, Oct. 4, the opening day of the A.E.R.A. convention, has a full program scheduled, covering all the associations. The first American session will begin at 10 a.m.

It is urged by the executive committee that all delegates who can should plan their itineraries so that they can reach Cleveland Sunday, Oct. 3. This will allow them to get comfortably settled and so avoid congestion at the registration booth and delay in reaching the meetings on Monday.

Bring Your Clubs to Cleveland

GOLF at the Cleveland convention will be somewhat unconventional. In days gone by it has been the custom to hold an official tournament on the Sunday preceding the convention. This, however, scarcely whets the appetite of an inveterate player, while it does crowd the local courses to the exclusion and discomfort of club members. The official tournament will, therefore, be dispensed with this year. Delegates and guests will be given opportunity to play in their own time and fashion without the usual congestion and delay.

There are many splendid private courses in and about Cleveland. The committee in charge will make arrangements for the delegates to play these various courses, thereby "distributing the load." There are also a number of public and semi-public courses, so that on Sunday or at other times outside the periods set aside for convention business and inspection of exhibits golf in all its forms and under "all operating conditions" may be thoroughly enjoyed.

Mayors Invited to Convention

MAYORS of all cities of 25,000 population or over are being sent individual invitations from President Frank R. Coates of the American Association to attend the Cleveland convention and exhibit. In his letter Mr. Coates points out the educational value of the exhibits to public officials, and the even greater interest to them in the questions to be discussed in the sessions, primarily the perplexing traffic problem.

The News of the Industry

Modernization in Memphis

First of Thirty-two de Luxe Cars in Service—Public and Newspaper Reaction Favorable—Full Publicity to the Event in Company Advertising

THE new electric rail coaches, operated by one man, have been received with favor by the public of Memphis, Tenn. Thirty-two coaches of the low-level, double-truck, semi-noiseless type were recently purchased by the Memphis Street Railway and twelve of the new model cars have been placed in service on one line of the system. The remaining twenty have been received, but are now being conditioned for service at the company's shops.

The cars represent an investment of $475,000 in additional equipment for the company's rolling stock. Numerous automatic and safety features are embodied in these cars. The exit doors, both front and rear, are automatically operated by a treadle that goes into action when the passenger steps on it, but only when the car is at a complete stop. The step slowly folds up when the passenger alights.

The cars are equipped with deep de luxe seats, upholstered in taupe plush, with Nachmann spring units.

A 9-in. numeral displayed above the right window on the front of the car indicates the route or line on which it operates.

Mosaic rubberoid tiling, ¼ in. thick, laid on a ½-in. thickness of Celotex, which rests on a ⅞-in. wood floor, helps to deaden sounds emanating from the trucks, rendering them semi-noiseless.

Rex metal sash increase the size of the glass and render it easier to operate the windows.

Pneumatic rotary gongs and electric registers are governed by a pedal by the operator.

Five 100-watt lamps afford illumination.

Artistic painting, "streamline effect," both interior and and exterior, gives an unusually attractive appearance to the cars.

Shipment of the cars was made direct from the St. Louis Car Company, St. Louis, which built the bodies. The electrical and air brake equipment was furnished by the General Electric Company, Schenectady, N. Y. The trucks were furnished by the J. G. Brill Company, Philadelphia; the wheels by the Southern Wheel Company, Pittsburgh, Pa.; the automatic step and door equipment by the Safety Car Devices Company, Chicago. Other details of the car were published in the JOURNAL for Aug. 21, page 330.

NEWSPAPER COMMENT FAVORABLE

Each of the newspapers of the city, following installation of the cars in service, reported the first day's operation, showing favorable acceptance.

On the second day after the service started the *News-Scimitar*, an afternoon publication, had a long editorial regarding the cars. The comment opened with these remarks:

> Wednesday the Memphis Street Railway started its one-man cars on one line. They were an immediate success. The cars are new, the seats are plush and the paint is fresh. The cars are long and commodious. The aisles are wide. Plenty of standing room. There are no finer cars in any city. The cars are so equipped that the power cannot be turned on until the doors are closed The doors do not open until the car stops. The passenger standing on the exit platform causes the door to open when the car stops for passengers to alight.

The Memphis *Press*, another afternoon paper, in a semi-editorial column that appears on its front page, under the caption "Among Us Folks," had this personal sort of expression regarding the cars:

> I rode on one of the new one-man street cars yesterday. I was surprised at its beauty and its elaborate furnishings.
>
> The seats on this car were of clean, soft plush. They are comfortable, and I enjoyed sitting in one of them.
>
> The floor was covered with a rubberoid material. It was not dirty, and so far no one had spit on it.
>
> I gazed at the cream-colored ceiling as the car glided easily along and felt that I was getting my money's worth.

In the *Commercial Appeal*, the morning paper of the city, the following remarks constituted a part of the story regarding the cars:

> The coaches—for coaches they are—are big, airy and easy-riding.
>
> "As delightful and comfortable as a parlor car," remarked a woman to her escort. Plush upholstery in taupe, somebody said. Anyway, it was a nice, rich color.
>
> The windows are large, the window sills low, and it is just like riding in a club car.
>
> Five ceiling lights illuminate the coach so brightly that one can read as comfortably as at home under a bridge lamp.
>
> They are wonderful trolley cars in every detail. They are painted in attractive colors, and the interior arrangement illustrates the last word in modern car comfort.
>
> Now, here's a tip to the trolley-riding public, as a suggestion to facilitate travel: Have your 7 cents ready. Drop it into the box and pass on in.

THE COMPANY'S ANNOUNCEMENT

On the day before the cars were put in service and also on the day operations began the company used large advertisements in each of the newspapers announcing them and directions for passengers. These were crash advertisements in that each occupied space equal to about three-fourths of the whole page.

The first advertisement was devoted principally to a description of the new type of cars and the second mainly to a request for public co-operation in making their operation most beneficial to patrons. A part of the second advertisement stated:

> **For Better Street Car Service**—We are adding 32 modern electric rail coaches and want patrons to profit by the conveniences they afford. We ask you to observe these suggestions:
>
> Enter cars at front.
>
> Have exact fare, or metal token, ready to deposit in fare box.
>
> If transfer is desired, ask for it when paying fare.
>
> Pass into car promptly to allow other passengers to board.
>
> White passengers seat from front toward rear. Colored passengers seat from rear toward front.
>
> White passengers leave car by either front or rear exits.
>
> Colored passengers leave car by rear exit.
>
> When destination is reached, step onto treadle at exit door. This causes the door to open automatically when the car stops.
>
> Doors cannot open when car is in motion. Nor can the car start until doors are closed.
>
> Avoid standing on treadle unless preparing to leave car—to do so prevents the operator from starting car when at a stop.

Subsequent advertisements by the company, using smaller space than the opening announcements, have taken up the various thoughts suggested previously, and treated each separately and more fully, in explanation of how compliance with them facilitates service in the mutual interests of patrons and the company.

Company officials have expressed satisfaction at the favorable reception accorded the cars during initial days of operation.

Toledo Grant Under Discussion

In informal discussions of the new franchise proposals at Toledo, Ohio, the members of the board of control indicated it was their opinion that there would have to be some scaling down of the capital of the Community Traction Company under the new plan if fares were to be kept at a reasonably low level. Just how this could be achieved is not evident, particularly as under the terms of the former settlement capitalization and value are believed to have been brought to approximate each other.

A special election will probably be necessary for the submission to Toledo voters of the new amendments to the Milner ordinance to put into operation recommendations of Prof. H. E. Riggs and Attorney Newton D. Baker.

City officials declared that it was impossible to have the completed text of the proposal ready for Council on Aug. 30, the final date to put the measure through in time for the regular November election.

Meanwhile Law Director Frank M. Dotson has been working to bring various proposals together into the completed document. Dewey C. Bailey, attorney for Henry L. Doherty & Company, operators of the property, has been in Toledo at work upon the plan. One of the sticklers in the final draft was a clause involving the power rate.

It is now thought that the special railway election may be held a few weeks after the November election. In that event the voting booths and machinery would be preserved intact in the meantime.

T. E. Mitten Discusses Industrial Peace

Head of Philadelphia Rapid Transit Company Outlines Present and Future Work at Annual Outing

Speaking with enthusiasm on the subject of industrial peace and the means by which it might be generally effected, Thomas E. Mitten, chairman of the board of the Philadelphia Rapid Transit Company, Philadelphia, Pa., made a deep impression upon his hearers on the occasion of his annual banquet to the employer and employee committeemen of the company. This event is held simultaneously with the annual outing at Willow Grove Park, near Philadelphia, which the employees of the company attend en masse with their families. Aug. 31 and Sept. 1 were the dates for the picnic this year, half of the employees attending on each of the days with the committeemen's banquet taking place on the evening of the second day.

Mr. Mitten discussed the manner in which the co-operative plan, upon which the present structure of the Philadelphia Rapid Transit Company is founded, has gradually evolved, from the hopeless confusion of 1911 to the "Market Basket" wage and participation in profits which the men have today. His hope, he declared, is to have labor everywhere continue this metamorphosis into the rôle of capital along the lines which have been proved as practicable by the Philadelphia company. Only in this way may strikes and their resulting hardships be eliminated for once and all, since a man who owns a share in the company for which he works will not strike and imperil that which is his own.

Reaffirming the remarks which he made earlier in the day before the mass meeting of employees and their families, he decried the widespread adoption of installment buying, with its consequent urge to live beyond one's income and the feeling that it is necessary to keep up with "Mrs. Jones" next door. At the mass meeting he had appealed particularly to the women to curb these fallacious practices; at the evening banquet he urged his committeemen to throw their every effort into the campaign to build up the saving habit.

Mr. Mitten went into some detail in discussing the co-ordinated transportation service which exists in Philadelphia and complimented the various branches of the service on the diligence with which they have applied themselves to their respective jobs and the enthusiasm which they have for those jobs. Mr. Mitten mentioned again the figures which had been quoted in the afternoon meeting by President W. K. Meyers to the effect that $20,000,000 a year has been saved out of a gross income of $50,000,000 by the economies carried out by the company's employees. Of this startling amount $2,000,000 is shared equally between Mitten men and management, while the public receives the balance in improved service, reduced fares and similar items.

The speaker went into some detail on the results obtained with the P.R.T. air service and discussed generally the future of aerial transportation in this country. He closed with a pledge to devote his every effort in future years to furthering industrial peace and transforming labor into capital throughout the country.

Dr. A. A. Mitten was the toastmaster at the banquet, at which, in addition to Mr. Mitten, a number of the committee chairmen and of visiting guests from the International Railway, Buffalo, discussed the work of the co-operative associations. More than 60,000 people attended the outing during the two-day period.

Romance in Milwaukee Street Car Movie

HAVING told the people of Milwaukee about its transportation and electrical services through the medium of the spoken word, together with publicity and advertising in the newspapers, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has entered the field of motion pictures. Camera men are already "on location" shooting scenes for the new film which will consist of three reels. As yet no title has been selected but the film will be shown in Milwaukee theaters next autumn and winter. The scenes, all of which will be taken in Milwaukee, will be developed around the romance of Jimmie, a motorman, and his sweetheart. Kelsey Cook and Gladys Moore (Miss New Orleans, 1925), of Rothacker Industrial Films, Inc., take the leading parts. George Bainbridge of the Rothacker firm is directing the film.

Another Step Toward Enactment of Louisville Ordinance

After being passed about two weeks ago by the Board of Councilmen, the new franchise ordinance of the Louisville Railway, Louisville, Ky., went to the upper board, or Board of Aldermen, on Aug. 24, and with certain amendments was unanimously passed. On account of these amendments the bill will now have to go back to the Board of Councilmen. It is reported that the lower board will pass the amended bill, it having been approved by the president of the Board of Councilmen, in amended form, prior to final action by the Board of Aldermen. The Mayor has indicated that he will sign it. As it stands the ordinance provides among other things:

Continuation of present 7-cent fare for two years, with general transfer privileges.

Half-fare for school children, with free rides for police, firemen and park guards when in uniform.

Combine ride by street car and buses for the same fare charged on buses not to exceed 10 cents.

Appraisal of the street railway property by a competent appraiser to be appointed by the Mayor.

Change in rates may be made by the General Council after the expiration of two years.

The railway is required to make monthly operating reports to the Board of Works.

Board of Works is required to supervise the management of the railway, although nothing in the ordinance is to be construed as relieving the company of the private management.

Adequate service is required of the company at all times.

The company is required as an expense of operation to accrue adequate sums for depreciation and amortization and to set up these sums in the form of reserves under the accounting system then in force.

To obtain new money for improvements, extensions or betterment of the service, the company may, from time to time, issue and sell new securities in such amounts as may be necessary to meet the demands.

The company is required to construct and maintain the supporting substructures of the streets, and make repairs to any streets damaged in the laying or repairing of the company's tracks.

In the event the company knowingly fails or refuses to abide by the terms of the ordinance it shall be subject to a fine of not less than $50 nor more than $100 for each offense, and each day's failure or refusal constitutes a separate offense.

Chicago Aldermen to Hear New York Traction Offer Sept. 9

The New York bankers who propose to finance the Chicago Surface Lines under a new twenty-year franchise will be heard by the local transportation committee of the Chicago City Council on Sept. 9, it was announced after a conference between Judge John M. Harlan, who tendered the offer to Mayor Dever on Aug. 26, and Alderman Joseph McDonough, chairman of the committee.

According to the proposal as outlined by Judge Harlan, their go-between, the Eastern financiers are willing to put up in the neighborhood of $40,000,000 in new capital on a 20-year agreement, refund the outstanding securities and pledge themselves to accept a new ordinance providing for unification of elevated, surface and bus lines at a single fare, and subways if the needed legislation is secured.

Several prominent Chicago bankers who refuse to take the proposal seriously say that a 20-year franchise is inadequate, that the $40,000,000 for extensions and improvements is insufficient and that the present bondholders would enter no such agreement. The refunding bonds, as proposed by Judge Harlan, would constitute only a secondary lien against the property after a prior lien sinking fund issue to raise money for the suggested betterments.

Sunday Passes on Three Adjoining Ohio Interurbans

Owing to the successful revenue and riding results obtained with the Sunday unlimited-ride pass since its installation on July 4, the Stark Electric

Railroad, Alliance, Ohio, has extended its use to include holidays as well. The first of these holidays will be Labor Day, when the pass will be especially welcome because of an unusually important Labor Day celebration at Alliance. The pass sells at 50 cents to adults and at 25 cents to children who are between six and thirteen years of age.

As of Sunday, Sept. 5, the Northern Ohio Power & Light Company and the Youngstown & Ohio River Railroad will add Sunday passes for trial use on all September Sundays and also on Labor Day. The Northern Ohio will issue adult and children's passes at 50 cents and 25 cents respectively, while the Youngstown & Ohio River Railroad will issue just one price pass, viz., 50 cents.

The Northern Ohio pass will be good for unlimited rides by bearer on the interurban cars between Canton and Uhrichsville and also on the local or city cars in Canton and Massillon. The Youngstown & Ohio River Railroad's pass will be good between Salem and East Liverpool. As Canton and Salem are the terminals of the Stark Electric Railroad, the latter will afford a gateway for cheap and convenient travel between points on the adjoining systems. It will be possible for a person buying three 50-cent passes to ride from Uhrichsville to East Liverpool, the total cost of this and all other long rides being very much less than at existing rates of fare.

Arbitration Hearings End

Review of Summing Up of Counsel for Boston Company in Wage Case Which Now Goes Before Board for Its Decision—Many Telling Points Made

IMMEDIATELY after Labor Day the arbitration board which has heard the Eastern Massachusetts Street Railway wage dispute will meet for its first discussion of the evidence in the case. Then Judge John C. Leggat, the chairman and neutral member of the board, will write the decision.

In his argument in behalf of the railway, Arthur G. Wadleigh, who is a member of the board of trustees and its attorney in the arbitration proceedings, said at one point:

> If there is any merit in the demands for increased wages and changed working conditions, you may be sure you have the advantage of everything that can be said in favor of it. Nothing has been skipped in this case. I don't remember that Mr. Vahey (counsel for the men) has read anything here from Justice Higgins of Australia, but if he hasn't I venture to say he has put it in the record. He covers not only this country, but the Antipodes in his search for something that will enable you or induce you to believe that these men haven't had a decent wage for the last twenty years and won't have a living wage for the next year unless you increase their wages.

Mr. Wadleigh said that really the important question was whether the men should have more wages—a question contingent and predicated upon whether they are now receiving a decent living wage. He said he had always contended, now contended and should continue to contend that the financial condition of an employer under some circumstances should be considered a factor in determining what he shall pay to his employees, but that he had never taken the position, and did not now take the position, that these gentlemen were not entitled to a decent living wage irrespective of the financial condition of the company. He did not for a moment take the position or assert that the company could not pay what the board of arbitration decided to be a decent living wage. Mr. Wadleigh said:

> Our contention is that we are paying a decent living wage, and I believe that I would be justified in resting what I have to say with reference to that contention solely on the evidence that has been introduced here by Mr. Vahey himself. You do not suppose for a moment, Mr. Chairman, do you, that Mr. Vahey in culling the length and breadth of the Eastern Massachusetts Street Railway and bringing here his human exhibits to show why they should have more wages, has picked out the best examples of comfortable living? He has probably done as well as he could, in picking out personnel, and in every instance where a witness has appeared here in answer to questions on either direct or cross-examination he has been obliged to admit that he has had a comfortable living ever since he went to work on this street railway, and that he has brought up his family, if he had one, in respectable surroundings and in a creditable manner. Not one of them has answered "No" to a question of that kind. Here is Powers. He has worked for this company since his former employer went into obsolescence. He has been a valued employee, and is today. He has brought up a creditable family in a creditable way. I put the question to him as to whether he thought he had a good job, and he was an honest enough man to say "Yes." He went on to point out some factors that made it a good job that I hadn't thought of and didn't know. He said it was a stepping stone to other jobs, and he said that the greater part of the traffic policemen on the streets of Lowell were recruited from the ranks of the Eastern Massachusetts employees.
>
> Here is McGowan. He says it taxes his mental capacity to operate a one-man car. Yet he learned how to do it in two days, and he is the president of the general conference board. If his mental capacity was of such limited caliber that it taxes it to run a one-man car he wouldn't be president of that board; and so on, all through.
>
> It is significant that the average age of the men employed on our road is 46 years, and that the average length of service is nineteen years. Do you suppose that men of the caliber of the witnesses who have appeared here would stay for nineteen years, and that is the average length of their stay, in an employment or occupation that did not afford them a decent living wage and a chance to bring their families up under decent American conditions?
>
> Now let us see just for a moment what constitutes the yardstick of the cost of living as applied to them. The wages on this system between October, 1913, and June, 1926, have increased 117.9 per cent. During the same interval the cost of living has increased only 60.9 per cent.

Mr. Wadleigh then pointed to the fact that Judge Enright's award last year was based wholly on the cost of a decent living. Every other consideration, offered either by the men or by the company, was set aside and Judge Enright proceeded to give the men what he found to be a sufficient wage for a decent living. There has been no change in the cost of living since then. He then said:

> It is true the company has asked you to cut the wages of the men. That is one of the articles of submission here. We haven't receded in any way from that request, but I am going to be exceedingly frank and say I do not expect you will do it, but I see no reason whatever where your Honor can say Mr. Vahey has sustained his burden of proof on the question of whether these men shall have any more pay than they do now.

Mr. Wadleigh said that the proverbial last straw which breaks the camel's back might come into existence on the railway or on a part of it. Every increase in fare had a marked effect on the public, and the diminution in riding consequent upon an increase in fares was not to be measured wholly by what it costs the pocket book of the rider; it was to be measured somewhat by their outraged feelings. It was pretty easy for them to get a Ford.

According to Mr. Wadleigh the exhibits in this case showed that the Eastern Massachusetts Street Railway was paying its employees more than the average railway in this country. He also said that the average earnings on the Eastern Massachusetts Street Railway were in excess of the average weekly earnings of the employees in the textile and woolen mills and shoe factories and tanning industry, the main industries upon whose workers the railway must depend for its patronage. The Eastern Massachusetts is a one-man railway, 96 per cent of its mileage is one-man operation; 90 per cent of its personnel are one-man operatives. So Mr. Wadleigh said that when the arbitrators were fixing wages for one-man car operators they were fixing wages for the blue uniform men on the Eastern Massachusetts system. The basic rate to which he alluded was a rate in name only, as it applies to 10 per cent of the persons employed on the road.

The men on the Eastern Massachusetts system earned last year an average wage of $1,825. That, of course, took into consideration all classes of men, including one-man car operators. That was an average wage of $36.45 a week—remuneration much greater than the average wages of the working people in manufacturing and textile cities and towns served by the railway. The average weekly wage in June, 1926, of male boot and shoe workers was $25.03. The male workers in the woolen and worsted goods averaged $21.10; the workers in cotton mills $21.71 as against $36.45 a week average earnings on the Eastern Massachusetts. Mr. Wadleigh said frankly that in earning that average the men did probably work more than six days in the week on an average. They were entitled to consideration of that factor for what it was worth. In Fall River average payroll earnings in June were $18.39, in Brockton $23.09, Lawrence $22.50, in Lowell $19.37, in Taunton $22.57. Counsel for the company also said very frankly:

> Now an increase in wages, as far as anybody representing the Eastern Massachusetts is able to see, must inevitably result in an increase in fares. Whether an increase in fares will bring an increase in gross revenue is in the laps of the immortal gods; nobody knows. We don't know. In that connection your Honor has to consider whether it is fair play and decent usage to car riders, the majority of whom are receiving much less per week in wages than our men, to add to their cost of living by increasing the cost of a necessity in the life of these people riding on these cars, for it has been admitted here on all hands that the riding has all gone except the necessity riding.

Resumption of Service Promised Argentine, Kan.

According to William G. Woolfolk, president of the Kansas City Public Service Corporation, Kansas City, Mo., the proposed successor to the Kansas City Railways, street cars will again be operating over the Twelfth Street bridge into Argentine, Kan., as soon as the corporation gets possession of the railway, probably about Oct. 1. Mr. Woolfolk made his statement after Powell C. Groner, attorney for the reorganization committee of the railway, had offered to furnish Argentine with street car service providing Kansas City, Kan., would forego a $12,000 annual rental on the viaduct. At the same time William Drennan, city attorney, had said he believed the viaduct rental could be abated legally.

New South Shore Service Started

Downtown Chicago and South Bend, Ind., were connected on Aug. 29 by high-speed electrically operated trains of the Chicago, South Shore & South Bend Railroad, operated under their own power to and from the Illinois Central Randolph Street suburban station.

Limited trains make the run from the Randolph Street station to Hammond in 37 minutes, to East Chicago in 42 minutes and to Gary in 57 minutes. Trains run from Chicago to Michigan City in one hour and 35 minutes and from Chicago to South Bend in two hours and 30 minutes.

Control of the South Shore Line was acquired a year ago by the Midland Utilities Company and since that time an extensive rehabilitation program has been carried on. The line has been completely re-electrified and now the electrification of the Illinois Central makes it possible for South Shore Line trains to run downtown under electric power from Kensington, from which point they have heretofore been towed in by Illinois Central steam engines.

The South Shore Line is the only railroad serving that part of the Indiana Dunes now owned by the state, and South Shore Line trains stop at Tremont, the main entrance to the Indiana Dunes State Park, which was formally opened on July 1.

More Praise for Grand Rapids Cars—More Patrons Carried

Emphasis is placed on the increased patronage on the lines running the new cars of the Grand Rapids Railway, Grand Rapids, Mich., in an article in the Detroit *News*. The account states that the cars have been operating for about a month, and in that time one line has increased its earnings 8.04 per cent over the similar period last year when the old cars were in service. Another line shows 7.95 per cent increase and a third 2.99 per cent. The new cars are concentrated on those three lines. The lines using the old cars, on the other hand, showed an increase in earnings of only 1.46 per cent over last year. The article in the *News* gives a brief account of the installation of the new cars and of the plans to arouse public interest and to improve the service. It is illustrated with pictures of the inside and outside of one of the cars and also with a portrait of Mr. DeLamarter, vice-president and general manager of the company, who is largely responsible for their design and unusual features.

Organized Accident Prevention Work Promotes Safety

Not a single fatal accident among the 6,000 employees of the United Railways, St. Louis, Mo., since Jan. 1, 1926, and not one street car involved in a fatal accident since May 1 is the record set by the St. Louis street car system, according to a report made public by Girard C. Varnum, secretary-manager of the St. Louis Safety Council.

Nine accidental deaths involving street cars have been recorded this year, compared with fifteen deaths during the same period in 1925, fifteen during 1924 and twelve during 1923. Varnum attributed the good showing to the United Railways' organized effort to prevent accident. The company holds safety first meetings every month for the carmen and other employees, while keen competition among the various sheds for the best accident prevention record is encouraged. Prizes are awarded the sheds making the best showing each month. New employees are given a rigid course of instruction and must undergo a thorough test and examination before being permitted to work on the cars.

Boulevard Plan for St. Louis Approved

United States District Judge Faris on Aug. 25 authorized Receiver Rolla Wells of the United Railways, St. Louis, Mo., to accept the proposal of the Board of Public Service providing for the removal of its present tracks in Olive Street between Twelfth Boulevard and Channing Avenue and placing them in a central parkway when Olive Street is widened from 60 ft. to 100 ft.

Opposition to the proposed plan has developed among property owners along Olive Street and some automobilists are also opposed to it. However, as more than 90 per cent of the users of Olive Street ride in the street cars, the Board of Public Service has decided that the parkway will speed up traffic along Olive Street and protect railway patrons from reckless automobile drivers.

The plan for the reconstruction and widening of Olive Street with a parkway in the center for the exclusive use of street cars has been approved by the Chamber of Commerce. The committee found that the neutral zone for street cars would speed up the cars, expedite all other traffic using the street and enhance the safety of pedestrians. The total cost of the widening and paving has been estimated at $2,783,507, of which property lying east of Twelfth Boulevard and west of Channing Avenue and the city generally will pay about 60 per cent. Property actually facing on the improvement is to pay less than 40 per cent of the expense.

Tunnels Come High in New York —$15,000,000 a Mile

Contractors have been invited to bid on construction of the municipal subway from Eighth Avenue, Manhattan, through 53d Street to and under the East River to Nott Avenue in Long Island City. The job will be let in three sections. On Oct. 1 bids will be opened on the two sections crossing Manhattan and on Oct. 15 bids are asked for the tube under the river.

The estimated cost of this branch to Nott Avenue is $30,000,000. The length is a little more than 2 miles. Costs of station finish, cars, equipment and power supply will be added to construction, and for land damages there will be a liability not yet computed. Within conservative calculation the sinking fund requirements for this 2 miles of subway will be $2,000,000 a year for 50 years.

The new tunnel will be eleven blocks north of the Interborough Rapid Transit Company's and seven blocks south of the Brooklyn-Manhattan Transit Company's. It will be a competitor of both lines. All three will connect in Long Island City with the terminal the Long Island Railroad is building to relieve the congestion at Pennsylvania Station.

Pay-as-You-Pass Plan in Milwaukee

To overcome objection in the Railroad Commission's recent city-wide report on railway service that the articulated trains were slow, delayed traffic and did not carry full loads, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has introduced a new method of operating these cars. Hereafter the front car will be run as a pay-as-you-leave. Passengers enter this car at the front without paying fares to the motorman. If they remain in the front car they pay their fares to the conductor at the center entrance when they leave. They can also pass through to the rear car, paying the conductor when they pass him. The rear car will be loaded as heretofore at the center, passengers paying as they enter but taking seats in the rear car only. With two entrances in use instead of one under the old plan, loading is greatly expedited. The only exit is at the center. Cars operated in this fashion carry a sign at the front reading "Double Car, Enter Front or Rear."

Franchise Renewal Asked by Ohio Line

The Cincinnati, Hamilton & Dayton Traction Company, Cincinnati, Ohio, recently applied to the City Council for the renewal of its 25-year franchise. The matter was taken under advisement. Julius Lochsinger, chairman of the committee, said that changes in the transportation system of the city since the original franchise was granted have made it necessary to adapt the new privileges sought to the plans now existing. The company is already operating buses in conjunction with the service.

News Notes

One-Cent Raise for Mansfield Employees.—Employees of the Mansfield Public Service Company, Mansfield, Ohio, have signed an agreement for 1926, accepting the company's offer of an increase of 1 cent an hour in wages. This makes a flat rate on all lines of 57 cents an hour. A clause was included in the agreement which gives the men the right of signing on either buses or cars in accordance with seniority and at the car rate of pay.

Free Trip for Portland G. A. R. Members.—The Portland Electric Power Company, Portland, Ore., on Aug. 24 transported free members of the G. A. R. who attended the Sells Floto Circus as guests of the circus management.

Compensation Claims Dismissed.—Compensation claims of A. L. Shapleigh and Henry S. Priest against the United Railways, St. Louis, Mo., aggregating $120,000 were dismissed in the federal court Aug. 11. Mr. Priest sought $69,750 for services as general counsel for the corporation. Mr. Shapleigh asked $30,737 as president over a four-year period and additional $19,687 as president for two years and seven months.

Paving Question Point in Franchise Discussion.—The City Commission of Middletown and the Cincinnati & Dayton Traction Company, Hamilton, Ohio, are at a temporary deadlock over the question of renewing for twenty years the franchise of the company, which desires to be relieved of any future paving between tracks and 18 in. each side. The City Commission insists upon the company's assuming paving burdens.

One-Man Cars to Speed Up Service.—Fred Cooper, manager of transportation for the Portland Electric Power Company, Portland, Ore., has announced that one-man cars are to be run on the Richmond line, except during the peak hours of traffic, thus cutting the schedule from 12½ to ten minutes. Later, if patronage justifies, it is planned to add another car. Mr. Cooper states that this is part of a general movement which the company intends to sponsor to encourage the public to ride street cars. In order to accomplish this purpose the shortest possible intervals between cars must be provided. One-man cars, however, will be introduced only on lines where it seems feasible.

Rental Agreements Continue Between Ohio Lines.—Agreements between the Community Traction Company, Toledo, Ohio, and interurban lines entering the city over the local company's tracks have been extended at the old rental rate for the balance of the calendar year. The rate imposed by the agreements, which expired on Aug. 1, involved both car mileage and ton mileage as its basis. It averaged about 20 cents for the 18-ton cars and 36 cents a car-mile for the 40-ton type of car. Officials of the company had intended to ask for a revision upward, but put the matter over for a few months in order to avoid any issues during the settlement of the amendments to the Milner service-at-cost ordinance.

More Arrests in East St. Louis Hold-Up.—I. Lochman and J. Giardano, St. Louis youths suspected of participation in the $8,100 robbery of an East St. Louis & Suburban money car in East St. Louis, Ill., on July 19, last, have been held for the St. Clair County Grand Jury under bonds of $30,000 and $35,000 respectively. At a preliminary hearing before Justice of the Peace Grossman both youths were identified by Joseph T. Van Dusen, an assistant cashier of the railway, and A. B. Shiek, motorman of the pay car, as two of the bandits who staged the robbery. As recorded in the ELECTRIC RAILWAY JOURNAL of Aug. 14, five other men and a woman are under arrest in connection with the robbery.

Increased Fare Asked by Ohio Company.—The Northern Ohio Power & Light Company, Akron, Ohio, is asking to increase its fare from Akron to Wadsworth from 20 cents to 25 cents. All that remains is for the Wadsworth Council to grant permission. The present franchise with Wadsworth has five years to run. The company asks the right to increase the fare between Wadsworth and Barberton from 10 cents to 12½ cents in tokens or 14 cents cash.

Foreign News

Ticket and Change Machine

Experiments are now being made with a new combination ticket-issuing and change-giving machine by the London underground railway companies. A passenger desiring a 2d. ticket inserts 6d. or a shilling in the slot and receives a ticket and 4d. or 10d. change instantaneously.

Statistics show that 65 per cent of the traveling public throughout the day ask for change and it is thought that the slot machine, which gives both ticket and change by the same operation, will prove very popular with the underground passengers.

Berlin Buses in 1925

The report of the Allgemeine Berliner-Omnibus A. G. (General Berlin Omnibus Company, Ltd.) for the year 1925 states that the suburban lines still failed to meet expenses. The increase in number of routes, which are now thirteen city and six suburban lines, was accompanied by an increase of passengers from 48,058,153 in 1924 to 77,163,551 in 1925 and a corresponding increase in bus-kilometers from 8,475,264 to 13,859,302 (5,254,664 car-miles to 8,592,767 car-miles). The passengers per bus-mile were respectively 9.2 and 8.9.

Revenue from transportation was 14,980,625 marks and operating expenses 11,505,121 marks. The latter sum approximates $2,795,715, which leads to an operating cost of 33 cents per bus-mile for the mixture of double-deck and single-deck vehicles used. The total earnings were 14,993,122 marks. From this amount depreciation and other allowances totaling 2,435,357 marks were made as follows: structures, 636,893 marks; vehicles, 1,451,017 marks; machinery, 273,437 marks; inventory or supplies, 74,010 marks.

Of the net earnings of 1,052,644 marks remaining, 119,883 marks were assigned to reserves, 6 per cent (72,000 marks) was paid to preferred stock holders and 10 per cent (720,000 marks) to common stock holders. License fees amounted to only 43,200 marks. The remainder, 97,560 marks, was carried over as surplus to 1926.

The latest bus service to the suburbs was started by this company April 10, 1926, between Unter den Linden in Berlin and the fashionable suburb of Grunewald-Hundekehle. This route is 11 km. (6.8 miles) long with an over-all fare of 1 mark (24.3 cents) and a short-haul fare of half this amount. The run, which includes twelve stops, is made in 30 minutes. The vehicles are single-deck, 30-seat buses, run on fifteen-minute headways.

Liverpool's Prosperous Municipal Tramways.—"During the past year the Liverpool tramways carried 246,000,000 passengers," which meant carrying nearly the whole population of the city, each day, F. C. Wilson, chairman of tramways and electricity committee, stated after an inspection on March 8. The department paid £90,000 a year in rates and taxes, ran at the lowest fares in the United Kingdom, showed a profit, and contributed £50,000 in relief of local rates. There were 675 cars in service.

High-Speed Cars for Glasgow.—Two experimental cars are now under construction in Glasgow, one a single decker and the other a double. Ordinary cars in this city are four wheelers, but these two will be of double bogie type, having two 50-hp. motors each, geared for a maximum speed of 50 m.p.h. The development is one of the methods adopted by the Glasgow tramways for meeting bus competition.

Light Signals on Southern Railway.—Four-aspect color light signals have recently been installed by the Southern Railway of England. Each signal has four powerful electric lamps mounted on masts and arranged vertically. The lights, used all day and night, indicate as follows: Green—All right; proceed. Two yellows—be prepared to find next signal at caution. One yellow—be prepared to find next signal at danger. Red—Stop. The track circuit system of automatic signaling is also employed.

Passimeters in London and Berlin.—Berlin has decided to adopt the passimeter system now used at the London Underground railway stations. Eight new stations have also been added to the existing 27 now using it in London.

Recent Bus Developments

Final I. C. C. Bus Hearing Postponed

Announcement has been made by the Interstate Commerce Commission of an extension of time until the end of September for the railroads to answer questionnaires as to their bus operations, and of a postponement from Sept. 20 to Oct. 25 of the general hearing in Washington, which will conclude the investigation.

The time given the railroads to present full and complete data on their bus operations will permit a report from the B. & O. as to its new terminal coach system in New York.

A motor bus and truck bill will be brought up at the short session of Congress, but it is doubtful if any action can be had until the next long session, which does not meet until December, 1927. The Cummins-Parker bill, now pending before Congress, provides for divided regulation of buses and trucks by the federal commission and state railroad commissions. Hearings were held on this measure during the last session of Congress, but action was not taken. The I.C.C. hopes to have available for the coming session recommendations which will lead to drafting a measure that will have the approval of bus and truck operators as well as the railroads and shipping public.

Steam and Electric Roads Opposed Over Bus Rights

The Boston & Worcester Street Railway, Framingham, Mass., is seeking to obtain a license to operate a bus line between Framingham and Boston. Its plea is opposed by the Boston & Albany Railroad. The electric railway has a bus line now between Boston and Worcester and is operating trolleys over the proposed route between Boston and Framingham. The steam railroad objects on the ground that the buses would cut into the earnings on the train service between Boston and Worcester.

Equipment in Texas Sold for Scrap

Eight safety coaches once valued at $10,000 each were sold at Dallas, Tex., on Aug. 20 for $625 apiece under a court order. This equipment belonged to the Dallas-Fort Worth Safety Coach Company, organized two years ago to operate between Dallas and Fort Worth, a run of about 40 miles, in direct competition with lines of the Northern Texas Traction Company, winner of the Coffin prize two years ago and operator of the Crimson Limited trains.

Texas has no regulation and no public service commission. All the operator does is buy a bus and start to run. That is what the coach company did. It ran the eight coaches on varying schedules and at several different rates of fare. Innumerable jitneys, mostly nondescript touring cars, followed in the wake of the coach service. Since the jitneys made the 40-mile run for 50 cents both the railway and the coach company suffered, but particularly the coach company.

The Fageol Company secured a judgment on May 19, 1926, for $48,716 against the Safety Coach Company. The court ordered L. S. Gross, United States Marshal, to sell the coaches to satisfy the judgment. The Fageol Company alone bid for the coaches, and it bought them for a lump sum of $5,000.

$17,775,000 for Buses and Equipment in New Jersey

By the end of the current year the Public Service Corporation of New Jersey will have spent more than $17,775,000 for buses, garages, shops and other equipment necessary to provide the best bus service. Since it entered the business Public Service has bought more than 700 new buses. These are among facts being stressed in newspaper advertising run by the company.

Interstate Bus Rights Asked

The Scioto Valley Railway & Power Company has asked the Ohio Public Utilities Commission for permission to operate eight twelve-passenger parlor car buses for interstate traffic between Chillicothe, Ohio, and Huntington, W. Va. The buses will run on an hourly schedule if the permit is granted. They will travel over a route which will include stops at Portsmouth, Ironton, Ashland and Huntington.

Coach Service from Chicago to Grand Rapids

New motor coach service between downtown Chicago and Benton Harbor and Grand Rapids, Mich., was started on Aug. 29 by the Shore Line Motor Coach Company, owned in part by the Chicago, South Shore & South Bend Railroad.

Exclusive features of this new motor coach service are the reservation of seats and the option of riding between Chicago and Michigan City, in either direction, on the fast limited electrically operated trains of the South Shore Line, thus saving an hour in time. Motor coach tickets carry a coupon on which passengers are assigned specific seats, the same as in railroad parlor cars. Tickets and seat reservations may also be made in advance.

The Chicago terminal of the Shore Line Company's Michigan service is at the passenger station of the Chicago, North Shore & Milwaukee Railroad at Adams Street and Wabash Avenue. Stops will be made at the Auditorium Hotel, Chicago Beach and Windermere Hotels, and 63d Street and Stoney Island Avenue on the south side of Chicago.

Motor coaches are run from Chicago to Benton Harbor every two hours from 7 a.m. to 7 p.m., central standard time. One coach will run each way daily between Chicago and Grand Rapids. It will leave Chicago for Grand Rapids at 9 a.m., central standard time.

Bus Rights Sought at Lancaster

Application was filed at Harrisburg, Pa., on Aug. 27 with the Public Service Commission by the Conestoga Traction Company, Lancaster, Pa., operating in Lancaster and Chester Counties, for permission to extend its charter rights to include that of operating buses for freight and passengers on all its lines. Under a charter issued in 1922 the company now operates buses between Lancaster and Long's Park, Manheim Township, Lancaster County. The Cumberland Valley Transit Company, now operating between Chambersburg and Shippensburg, in an application filed with the commission, seeks permission to operate along certain streets in the two boroughs.

Bus Service Considered for Memphis Suburbs

A system of buses under the management of the Memphis Street Railway, Memphis, Tenn., operated through the principal suburbs of the city, is one of the possibilities of the city in the near future. Realization of the plan is said to be probable after the completion of the Poplar Avenue viaduct at Aulon.

The project hinges on extensions of Madison and Union Avenues to a point from East Parkway to Poplar Avenue, near Aulon.

The buses, if definitely decided upon, will operate through Highland Heights, east on Poplar, Southern Avenue, Lamar Avenue, and probably south of the city, it is said. Connections with cars on the Raleigh, Normal, Poplar Avenue and Lamar Avenue and Forest Hill lines may be made if the proposition is carried out. This will give suburbanites regular service at minimum cost. It will be dependable, and the buses will run on schedule time.

Plans for the Poplar Avenue viaduct are being whipped into shape. It probably will be completed late in 1927. The city will pay its portion of the cost, and the four railroads crossing Poplar at Aulon will pay their part. Officials of the railroads promise one of the best and most attractive viaducts of its kind in the South.

Latitude Asked in Twin City Operation

The Twin City Rapid Transit Company, Minneapolis, Minn., told the Minnesota Railroad and Warehouse Commission that in its supplementary bus operations it proposes to provide adequate and modern transportation service on the most economical basis and that if this new service does not command sufficient patronage the company does not propose to be bound rigidly to carry it on.

In two ways the company's attitude has been placed before the commission:

The Minneapolis City Council street car

> committee has been told that bus operation is experimental and that unless the buses are patronized to the extent of four cash passengers per mile or eight combination cash and transfer passengers the company would go before the state commission with application for permission to discontinue the service and such an application would not be opposed by the City Council
>
> The company has applied for more flexible schedules on its intercity and interurban bus lines, with a view to operating buses to meet the patronage and, while with minimum and maximum service clauses adequate service is to be provided at all times, the company would not be forced to operate uneconomically; the present requirements are more rigid.

The railway is now before the commission to obtain certificates of convenience and necessity under the state law for operation of five bus lines in Minneapolis.

Bus Service Extended in Kansas City

With the completion of the new paving on South Troost Avenue in Kansas City, Mo., the South Troost Bus Line of the Kansas City Railways has been extended from 61st Street south to the city limits at 79th Street. The northern terminus of the line is at 55th Street, at which it connects with the Troost Avenue car line.

The bus franchise originally provided that the buses should operate from 55th Street to 79th Street, but up until Aug. 22 the condition of the pavement south of 61st Street has been such as to prevent buses from operating over it.

Texas to Regulate the Bus

An amendment to the law placing bus and truck transportation under the jurisdiction of the Texas Railroad Commission will be required before regulation in the Lone Star State can be effectively enforced, according to C. V. Terrell, member of the Railroad Commission. For this reason rates and regulations will not be promulgated until after the next regular session of the Legislature in January, when it is expected the existing law will be amended so as to cure the defects that now prevent the Railroad Commission from exercising control.

More Independent Bus Lines Withdrawn in Cincinnati

Abandonment on Sept. 1 of the Elberon Avenue route of the Cincinnati Motor Bus Company is announced by Edwin Becker, secretary of the company, in a letter to E. D. Gilman, Director of Utilities. It was announced the company was losing money on the operation, and that the receipts for July were approximately $2,500 less than the cost of maintaining the service.

This is the second route to be discontinued within the last 30 days, the East End-Red Bank operation of the company being discontinued a few weeks ago.

Mr. Gilman said:

> Buses cannot operate successfully on their present rate of fare, and the people of Cincinnati who wish to ride in buses must come to a realization of the fact that they must pay a higher fare or expect discontinuance of service.

It is stated not a bus line in Cincinnati is able to hold its own, but that all are losing money at the existing rate of fare. In this connection attention has been directed to the report for July recently submitted by Walter A. Draper of the Cincinnati Street Railway, which indicates that railway operation for the month recorded a surplus of approximately $6,000, but that this was offset by a deficit of $15,000 incurred by the operation of its motor coach service.

Substitution of Buses Again Asked in Huntington

The Huntington Traction Company, Huntington, N. Y., is about to apply to the Town Board of Huntington for consent to substitute buses for trolleys over the entire 7½-mile route of the company's present railroad. The company would expect to have the buses in operation within 30 days after the order of the Public Service Commission authorizing the substitution was made, and also within 30 days after the commencement of operation of the buses would begin work on removing its tracks, poles and overhead equipment and of restoring the highway. The company made a similar application last May. Its president, E. T. Dempsey, states that with the co-operation of the Town Board and the Public Service Commission the operation of a motor system can be effected without delay.

A committee of the Huntington Chamber of Commerce, after considerable work, appeared before the Town Board several months ago with a request that the trolley line be abandoned and bus service substituted. Both the Huntington Traction Company and the Northport Transportation Company, which now maintains a bus service over a number of the town highways and between the village and Manhattan, applied for bus franchises. The Town Board awarded a permit to the Northport Transportation Company and refused the plea of Mr. Dempsey for a franchise.

Bus Service Discontinued.—The daily bus service of the Ottawa Electric Railway, Ottawa, Ont., to the Ottawa Hunt and Golf Club, via Mooney's Bay, has been discontinued because the revenue from passengers fell far below the cost of operation. In future this bus line will be operated only on Saturday afternoons, Sundays and public holidays.

Crosstown Line for Hartford.—Plans are being discussed by officials of the Connecticut Company with a view to establishing a crosstown bus line at Hartford, Conn. It is likely the line would be routed to accommodate the industrial area at Capital Avenue and would be extended thence to Farmington and Albany Avenues, probably via Sigourney Street.

Operation of Interstate Line Attached.—The Worcester Consolidated Street Railway, Worcester, Mass., has filed an equity suit against the Interstate Buses Corporation, Springfield, Mass., in the federal court at Boston. The railway asks an injunction to prevent the bus company from doing an interstate business between Worcester and Rhode Island. It also asks for damages. The bus company is alleged to be operating its buses without necessary licenses as demanded by the state laws.

Bus Service Extended in Tacoma.—The Tacoma Railway & Power Company, Tacoma, Wash., has started bus extension service on Pacific Avenue to the city limits, on Sixth Avenue and North Stevens Street to North Twenty-sixth and Proctor Streets and on Ruston Way from Old Tacoma to Ruston, on part schedule, which will be brought up to full operation early in September.

Nashville Railway Studies Efficiency of Buses.—J. P. W. Brown, vice-president and general manager of the Nashville Railway & Light Company, Nashville, Tenn., stated recently that bus experts and engineers have concluded a survey to determine the practicability of using buses as adjuncts of the railway system. The company's plans, however, are still indefinite.

Bus Service Increases Madison Street Car Earnings.—The operation of auxiliary motor bus service by the Madison Railways, Madison, Wis., continued to bring the earnings of the company in June above the revenues earned by the street cars alone in the past. Gross revenues from street car and bus patrons during June were $32,418, compared with $32,179 for June, 1925. In June of this year street car revenues were $29,863, a slight decrease from the income of $30,167 for June, 1925. Street car and bus passengers carried totaled 473,357 for June, 1926, compared with 459,097 for June, 1925. Passengers who used the street car last month totaled 439,554. This is a decided drop over a four-year average of 485,489 for that month.

Increased Rates Approved in Utica.—The Public Service Commission has approved an increase in the rates of the Utica Railway Co-ordinated Bus Line, Inc., Utica, N. Y., on the Parkway and Oneida Street lines within the city of Utica from 7 to 10 cents per capita. A strip of ten tickets will cost 75 cents.

New Transfers for Indianapolis Buses.—A new type of transfer slip has been adopted by the Indianapolis Street Railway, Indianapolis, Ind., for use on its buses. When the transfers are removed from the pads in which they are bound, they are so cut as to indicate the time of day they are issued. Lines to which the transfers are issued are indicated by directions instead of specific names. By using this transfer the company has reduced the number of punch marks from five to three and has made it possible for the conductor to issue transfers without making more than one punch mark at the time of issuance.

More Buses Used in Oregon.—T. L. Billingsley, superintendent of the railway lines of the Southern Pacific in Eugene, Ore., has announced that the company will substitute buses for the street car service between Eugene and Springfield. The Public Service Commission has authorized the railway to make the change.

Financial and Corporate

Abandonment Principles Laid Down in Mount Vernon Case

The Public Service Commission has approved a declaration of abandonment by the Westchester Electric Railroad of two portions of its line in Mount Vernon, as follows:

1. South Fulton Avenue line between East Sixth Street and the Hutchinson River, a distance of 0.536 mile of double track.
2. East Sixth Street from South Fifth Avenue to South Fulton Avenue, a distance of 0.369 mile of double track.

The abandonment is approved by the commission on condition that the railroad remove all its rails and structures and level and fill the part of the streets now operated by the company, under the supervision and direction of the city engineer.

The city of Mount Vernon opposed the application. Commissioner Van Namee, in a memorandum approved by the commission, says the questions before the commission are: Is operation of the routes proposed to be abandoned necessary for successful operation of the road and is operation of the routes necessary for the convenience of the public?

Paving of the two streets is planned by the city. The railroad submitted evidence showing that its estimated share of the cost of repaving South Fulton Street and reconstruction of track was $74,250 and East Sixth Street $41,020. The city claimed these estimates were too high, but did not present any evidence thereon. No passenger service has been in operation in South Fulton Street. The track has not been used since 1908 except to bring cars to and from the company's carhouse between the Hutchinson River and South Columbus Avenue. A new carhouse is now being built in East Sixth Street. There was opposition to abandonment by residents.

The city of Mount Vernon objected to removal of the tracks from portion of the streets in question unless the company removed all of its tracks from all the streets in Mount Vernon upon which it operated and abandoned its franchise.

Commissioner Van Namee in his memorandum says:

> This is a condition which has never been imposed by the commission in allowing an abandonment of portions of a street railroad line. It is, at least, doubtful whether the commission could force a street railroad to abandon its franchise. The company however, could abandon all of its lines in the city and abandon its franchise without the permission of the commission. What is necessary for the commission to determine is whether the abandonment proposed seriously affects the successful operation of the balance of the route and the convenience of the public.

Evidence submitted by the company showed net losses from 1921 to 1925 inclusive.

Earnings Off $1,000,000 During Interborough Strike

The net result recorded by the Interborough Rapid Transit Company, New York, for July was a deficit of $1,663,538, compared with a surplus of $252,855 last year, a decrease of $1,916,394. Of this decrease $770,000 is due to the receipt of that amount in July of last year as a cash payment on account of the new advertising contract, there being no similar payment this year. The difference is largely attributable to the strike on the company's subway lines during July of this year.

The statement of earnings and expenses for July was presented to the board of directors on Aug. 31. It showed total revenue from all sources of $4,016,301, a decrease of $1,242,910 compared with the corresponding month of last year. Expenditures for operating and maintaining the property increased $622,436. Taxes payable to city, state and the United States increased $33,684. Rentals increased $3,298. Income deductions increased $14,065.

$980,609 Transferred to Profit and Loss in Baltimore

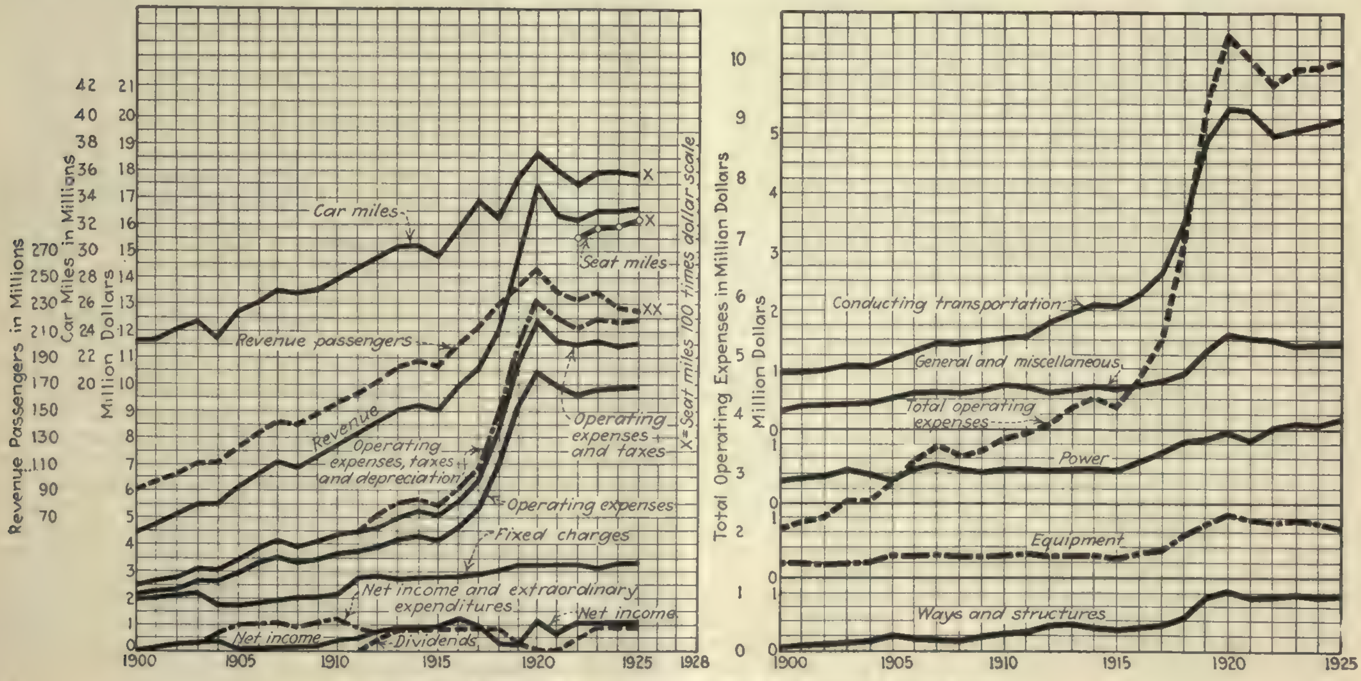
After paying all operating expenses and fixed charges, including interest on income bonds, the balance realized by the United Railways & Electric Company, Baltimore, Md., for the year ended Dec. 31, 1925, is $1,811,671. From this was deducted $818,448 for dividends and $831,061 for depreciation, the balance going to surplus. This statement was made in the twenty-seventh annual report to the stockholders of the company.

Since 1906 the company has set up depreciation reserves aggregating $14,315,000, out of which more than $13,000,000 has been put back into the property for reconstruction and improvements and for property retired, leaving a balance in the reserve account of $1,303,799. During the past five years the company spent for the items of maintenance and depreciation alone $13,686,551 and for capital improvements more than $5,300,000. During 1925 nearly $3,000,000 was put back into the property for upkeep and improvements.

The report goes into detail on the valuation proceedings and findings.

The total amount of taxes paid by the company during 1925 was $1,632,386. The total amount paid to the city of Baltimore in park taxes since the consolidation of street railway lines in 1899 now aggregates $17,229,980.

The report refers to the acquisition of all the buses, property, rights, privileges and franchises of the East Fay-



Operating Costs and Operating Results in Baltimore Since 1900

COMPARATIVE STATEMENT OF EARNINGS AND EXPENSES OF THE UNITED RAILWAYS & ELECTRIC COMPANY, BALTIMORE

Operating income:	1925	1924
Revenue from transportation	$16,481,077	$16,294,580
Revenue from other railway operations	140,142	158,674
Total operating income	$16,621,220	$16,453,254
Operating Expenses:		
Maintenance of way and structures	$966,995	$909,911
Maintenance of equipment	869,908	949,614
Maintenance of power	46,054	48,067
Total maintenance	$1,882,959	$1,907,593
Depreciation	831,061	822,662
	$2,714,020	$2,730,256
Power service	1,351,755	1,280,550
Conducting transportation	5,270,167	5,189,681
Traffic	*4,145	*12,558
General and miscellaneous	1,464,987	1,469,082
Transportation for investment—Credit	*19,973	*19,086
Total operating expenses	$10,776,811	$10,637,925
Taxes and licenses	1,632,386	1,656,073
Total operating expenses, taxes	$12,409,197	$12,293,999
Net operating income	$4,212,022	$4,159,255
Non-operating income	120,814	143,975
Gross income	$4,332,837	$4,303,230
Interest on funded debt	2,093,415	2,093,415
Remainder	$2,239,422	$2,209,815
Other deductions from gross income:		
Rents	$558,809	$546,343
Interest on unfunded debt	33,560	30,500
Interest on income bonds	559,080	559,080
Amortization of discount on funded debt	59,388	59,267
Miscellaneous	47,974	46,655
Total	$1,258,813	$1,241,847
Net income (transferred to profit and loss)	$980,609	$967,968
Seat-miles	1,627,061,900	1,601,907,976
Car-miles	35,717,666	35,973,691
Revenue passengers	224,235,527	228,423,774
Transfer passengers	92,893,828	91,879,977
Revenue passengers per car-mile	6.2852	6.3524
Maintenance cost per car-mile	.0527	.0530
Depreciation per car-mile	.0233	.0229
Ratio to total operating income:		
Maintenance and depreciation	16.33	16.59
Operating expenses and depreciation	64.84	64.66
Taxes	9.82	10.06
Operating expenses, depreciation and taxes	74.66	74.72

* Credit.

ette Street Bus Company by the Baltimore Transit Company, one of the United Railways & Electric Company subsidiaries. The Baltimore Transit Company operates bus service on various streets as well as trackless trolley service from Gwynn Oak Junction to Randallstown.

During the year the company reconstructed 15.3 miles of track and built nineteen additional articulated cars, similar to the sample car developed in 1924. In addition it increased its service during the year 25,153,924 seat-miles.

The company, in conjunction with the United Railways Association of Baltimore, an organization of employees, during the year expended for free medical and nursing attendance $88,281 and for pension and insurance payments $81,359.

Safety educational work among employees was continued during the year. The total car accidents in 1925 were 31 per cent lower than in 1919, when the safety department was organized and traffic conditions were much less acute. Personal injuries during 1925 showed a decrease of 34 per cent compared with 1919. The company transported 63,817 passengers for each one injured in 1919, and in 1925 106,210 passengers were transported for each one injured.

Part of Lebanon-Thorntown Equipment Sold

Disposition was made on Aug. 27 of part of the property of the Lebanon-Thorntown Traction Company, Lebanon, Ind. Retel-Hyman-Michaels bought the rails, trolley and feeder wire; the Big Four Railroad bought the right-of-way, and the Evans Electric Company bought the poles. The cars have not yet been sold. As recorded in the JOURNAL of Aug. 14, the railway had operated interurban service for 21 years between the center of the town of Lebanon and the center of the town of Thorntown, a distance of about 10 miles. The road has been operating at a loss for some time.

One Month's Accomplishment of Boston Elevated

On the 630,054 trips operated by the Boston Elevated Railway, Boston, Mass., during the month of July, 1926, 27,160,300 revenue passengers were carried and a total of 4,809,609 miles were operated. A statement from the office of the general manager of the company in which this year's accomplishments during July are compared with last year's is as follows:

JULY OPERATION AT BOSTON

General Financial Data	1926	1925
Cost of service exceeded revenue	$393,028.41	$249,477.93
Operating revenue per car-hour (A. E. R. A. std)	5.23	5.49
Operating revenue per car-mile operated, cents	54.24	56.77
Average fare per revenue passenger, cents	9.284	9.279
Ratio operating expense to operating revenue, per cent	83.95	79.23
Passengers Carried		
Revenue passengers	27,160,300	27,119,429
Per cent 5-cent and 6 cent passengers	17.39	17.25
Revenue passengers per car-mile operated	5.647	5.995
Operating Facts		
Trips operated	530,054	594,131
Car-miles operated:		
Rapid-transit lines	1,186,783	1,193,204
Surface, two-man	1,965,154	1,983,587
Surface, one-man	1,238,162	1,112,084
Express, newspaper and sprinkler cars	2,345	9,821
Motor bus	417,165	224,646
Total miles operated	4,809,609	4,523,342

$34,561 July Deficit of Toledo Company

Facing higher operating costs and less income from interurban track rentals the Community Traction Company, Toledo, Ohio, had a deficit in July of $34,561, according to the report of Commissioner E. L. Graumlich to the street railway board of control. The company carried 3,779,835 revenue passengers during the month, compared with 3,590,487 in the similar month last year. Accumulated deficits now amount to $747,092. Against this amount is the sinking fund, which has retired $1,261,000 of bonds and in which there is a cash balance of $79,451.

The commissioner reported that the first few days' operation of the new Front Street bus line had shown good income, but that higher fares might be necessary to keep from turning in a deficit from the bus operation.

Petition for Abandonment at Vancouver, Wash.

The Clark County Development Company, which holds the franchise and operates the railway in Vancouver, Wash., has petitioned the County Commissioners and the City Council for the cancellation of all franchises. A heavy loss, caused by the constantly decreasing number of passengers, is given as the reason for withdrawal. Earl S. Nelson, president, says the stockholders have had no return on their investment of $500,000 since the tracks were laid in 1917. During the years 1917-21 inclusive the revenue was such that operation could be continued, but for the last four years the loss has totaled $22,187. In 1925 the deficit was $10,129. It is stated that if the city and county refuse to release the company from its franchise it will have to go into receivership. The petition calls attention to the fact that the equipment is out of date. The company agrees to put the streets in condition. The system consists of 14 miles of track.

Service Discontinued on New Hampshire Line.—The Public Service Commission of New Hampshire has authorized the Manchester & Derry Street Railway, Manchester, N. H., to discontinue service on its lines. These orders are the result of an agreement between the State Highway Department, the town of Andover, N. H., and the Boston & Maine Railroad.

Change to No-Par Value Stock.—The Eighth Avenue Railroad, New York City, has filed a certificate in the office of the Secretary of State changing the par value and increasing the number of shares of its capital stock from 10,000 shares $100 par value to 50,000 shares no par value.

Branch Lines Abandoned in Ohio.—The Cleveland Southwestern Railway & Light Company, Cleveland, Ohio, has abandoned its branch lines from Elyria to Grafton, and from Penfield Junction to Amherst. Bus service between Elyria and Grafton has been started by the company and bus service connecting Amherst, South Amherst and Lorain has been increased.

Orders Traction Funds Invested in Municipal Bonds.—Investment of $5,374,000 from the funds of the Chicago City Railway, Chicago, Ill., in municipal bonds for current public improvements was approved July 22 in an ordinance adopted by the City Council. The plan was sponsored by Mayor Dever in the belief that it would bring larger returns than keeping the cash on deposit in banks. All but $9,000,000 of the total of $45,000,000 now held in the traction fund is already invested in corporation tax warrants, city bonds and Liberty bonds.

Legal Notes

FEDERAL CIRCUIT COURT—*Injunction Stopping Alleged Confiscation of Railway Property after Bond Is Given Held Proper.*

A franchise specified certain rates of fare, but in one section indicated that its purpose was to grant the company the right to obtain a reasonable profit on its investment. The court held that it had a right to grant an injunction preventing the continuance of the unprofitable fares and so increasing the rates until a decision could be had on the merits of the case. [City of Council Bluffs vs. Omaha & C. B. Street Railway, Ninth Federal (Second) Rep., 246.]

KENTUCKY — *Injury to Pedestrian Hurled on Track by Automobile*

Where a pedestrian, struck by an automobile, was hurled onto an electric railway track, the railway company was liable for injuries to him by its car only if the motorman failed to use ordinary care to prevent injury after discovering the peril. He is not required to maintain a lookout for such occurrences. [Ohio Valley Elec. Ry. vs. Payne, 481 Southwest. Rep., 523.]

MAINE—*Passenger Hit by Automobile After Alighting*

A passenger, who has alighted from a street car, is not required to look and listen before walking to the sidewalk, though if he does not do so in a street with much automobile traffic it may be strong evidence of negligence. An automobilist approaching a street car on the side opposite the car gates, which has stopped to receive or discharge passengers, must anticipate that some passengers may pass behind the car to the other side of the street. Hence, he must use increased care in passing. [Day vs. Cunningham, 133 Atlantic Rep., 855.]

MASSACHUSETTS—*Fire Apparatus Returning from Fire.*

A state law provides that members and apparatus of the fire department have the right of way in a street when "going to a fire or responding to an alarm." This right does not apply when the fire apparatus is returning from a fire. [Hoye vs. Boston Elevated Ry., 152 Northeast Rep., 738.]

MICHIGAN—*Construction of Terms of Public Utilities Act.*

The State Public Utilities Act declares it "shall not apply to carriers operating exclusively within cities or villages." An auto bus company, whose route lay entirely within the limits of two contiguous cities, viz: Detroit and Springwells, claimed to come under this exception. It was not sustained by the Supreme Court, which held the exception applied only when the carrier operated exclusively in a single city or a single village. [Red Star Motor Drivers' Association, et al. vs. Michigan Public Utilities Commission, 209 Northwest. Rep., 146.]

MINNESOTA—*Statute Giving Commission Power Over Rates with Appeal to Court, Affirmed.*

A section of an act of the legislature authorizes the Railroad and Warehouse Commission, in certain circumstances, to fix the rate of fare on street railways, but gives right of appeal to the Court. The constitutionality of this act was attacked by the City of Duluth on the ground that the establishment of a public utility rate is a legislative function and this power is ultimately invested in the courts. The Minnesota Supreme Court held, however, that under the act the courts were authorized only to set a fair value on the property and determine a fair return on such value, and that the act was therefore constitutional. [City of Duluth vs. Railroad & Warehouse Commission, 209 Northwest. Rep., 11.]

MISSISSIPPI—*Property Owner Sues for Damages Because of Discontinuance of Railway*

A city authorized a street railway company temporarily to discontinue operation on a certain line because of work being done on the street, but after the completion of that work, the city did not order a resumption of service. An abutting property owner on the route declared the market value of his property was reduced to approximately one-half because of the discontinuance of the service and sued the company for damages. The court held that a careful study of the franchise, which was not in evidence, would be necessary to determine the rights of the respective parties, but as the discontinuance presumably was temporary, it was an error in the trial court to assume that the measure of damages, if justified, was the difference between the value of the property with car service and its value with the service permanently discontinued. [Mississippi P. & L. Co. v. Maulding, 108 Southern Rep., 901.]

MISSOURI—*Thought Car Would Stop for Passengers. Excess Speed of Car Not Evidence of Negligence in Certain Circumstances.*

A truck driver about to cross a railway track noticed several persons standing on a corner between him and an approaching car as if they were waiting to board it. If he did not rely upon the belief that the car would stop for them, he cannot avail himself of an ordinance which requires the car to do so, and if he did rely upon the ordinance, he should not do so to the extent of failing to make use of his own senses for his own protection. Evidence of possible excess speed of the trolley over that permitted by an ordinance was also immaterial where the plaintiff was not acquainted with the ordinance and did not know or estimate the speed of the trolley car. He was therefore held contributorily negligent when injured. [Epstein vs. Wells, 284 Southwest. Rep., 845.]

NEW JERSEY — *Club Bus Held to Be a "Jitney"*

The New Jersey law permits every municipality to license and regulate auto buses "commonly called jitneys," fix their fees, etc., whenever the routes are wholly or partly within the limits of such municipalities. The borough of Edgewater passed an ordinance specifying the conditions under which such motor buses could be used, and under it stopped the operation of two buses operated by the "Workers' Club" in West Fort Lee, an adjoining borough. Membership in this club could be obtained for 10 cents a month dues, plus a tax of 90 cents a week, for which twelve rides could be taken. The club claimed that the buses did not come under the law, but the Court of Errors and Appeals of New Jersey held that they did. [Fort Lee Transportation Co. vs. Edgewater, 133 Atlantic Rep., 424.]

NEW YORK—*Unlawful Bus a Public Nuisance.*

A motor bus, not authorized by the Public Service Commission, the Transportation Corporation Law, or the Greater New York Charter, is a "public nuisance" even if it is operating under a permit from the Department of Plant & Structures. As such, the owner cannot collect damages from a street railway company whose car collided with the bus, in the absence of wilful, wanton or reckless conduct on the part of the motorman causing the collision. [Klinkenstein vs. Third Avenue Railway. 214 N. Y. Supp., 725.]

OHIO—*Company Not Liable to Intending Passenger Struck by Broken Pane of Glass in Car.*

Where an intending passenger, while standing in a safety zone preparatory to boarding a car, was injured when the approaching car stopped suddenly, and glass falling from a broken window cut her face, the law will not assume negligence by the company. The glass might have been broken by the act of a third person or caused by some other event with which the company had nothing to do. [Cleveland Railway vs. Sutherland, 162 Northeast. Rep., 726.]

UTAH—*Power of State Over Highways*

An order of the Public Utilities Commission, acting for the state, in forbidding a motor bus carrier to increase his service is within the power of the commission, especially if it believes such increase will seriously affect the ability of another utility, serving partly the same territory, to render service. [Gilmer v. Public Utility Commission of Utah, et al., 247 Pacific Rep., 284.]

VIRGINIA—*Paving Obligation Construed*

Where a franchise said in paving or repaving the track area, the city should furnish the material for paving and the railway should pay for the labor, the company was held liable for the cost of both material and labor for the concrete base under the rails and ties, such base being not properly a part of the paving because it was necessary to give a proper support to the rails and ties. [Virginia R. & P. Co. v. City of Norfolk; 133 Southeast. Rep., 565.]

Personal Items

Illinois Power & Light Personnel Changes

Changes are announced by the Illinois Power & Light Corporation, Chicago, in its executive staff.

W. A. Baehr, vice-president and general manager, has retired and is succeeded by L. E. Fischer, who has long been associated with the corporation and its predecessors, and more recently has become connected with the North American Light & Power Company, an affiliated company.

Scott Brown has retired as secretary and is succeeded by Dwight Holmes, and P. C. Dings has retired as treasurer and is suceeded by P. L. Smith.

Clement Studebaker, Jr., continues as president. No changes of personnel in the operating staff or management of local properties are contemplated by the Illinois Power & Light Corporation or by any of its numerous subsidiary and allied operating companies.

The changes in personnel are coincident with the reorganization of the North American Light & Power Company, of which the Illinois Power & Light Corporation is an important subsidiary. This reorganization was announced last June, but is just now completed and made effective.

In this reorganization the Middle West Utilities Company and the North American Company acquire a majority of the common stock of the North American Light & Power Company. Clement Studebaker, Jr., continues as president in active direction of the company and, with his associates, retains a substantial interest in the common stock.

J. J. McNally in Public Relations Post in Washington

James J. McNally, who has been engaged in advertising agency work in Washington for more than two years, has joined the Washington Railway & Electric Company, Washington, D. C., as assistant to C. Melvin Sharpe, who is in direct charge of public relations for the company as executive assistant to William F. Ham, the president.

The appointment of Mr. McNally in this division of the company's activities adds another advertising man to the rapidly increasing number of men in that profession who have in recent years chosen to specialize in public utilities work. His retention is not only in keeping with the tendency of nearly all public utilities to pay more and more attention to public relations, but is in line with work in which Mr. Ham takes an unusual interest, as is indicated by his own recent appointment to the committee on public relations of the National Electric Light Association.

Mr. McNally is a native of Chicago. At one time he was assistant advertising manager for the Hydro-United Tire Company, Chicago, Ill., and Pottstown, Pa. He is a graduate of the Technical High School, Techny, Ill., and an alumnus of Campion College, Prairie du Chien, Wis. For the past five years he has resided in the national capital—"by choice, not chance," he avers.

So it will be seen that he is schooled in mass pyschology and the problem of trying to strike a responsive chord in the public mind, one of the major problems of a street railway, namely, to please the public and, in pleasing them, profit. Aside from the technical knowledge of advertising practice and procedure which they bring to public utilities, men like Mr. McNally are qualified to apply principles of propounding advertising to arrive at ways and means of gaining the co-operation of car riders.

Messrs. Coen and Moore with Cleveland Electric Company

F. W. Coen, formerly general manager of the Lake Shore Electric Railway, Cleveland, Ohio, is now assistant to the president of the Cleveland Electric Illuminating Company.

George Moore, Fremont, also formerly associated with the Lake Shore Electric Railway, now is connected with the Cleveland Electric Illuminating Company.

Messrs. Phillips and Rossell Advanced

Well-Known Manager of Pittsburgh Railways Made Vice-President of Duquesne Light Company—Former General Superintendent of Railway Advanced to Managership

ANNOUNCEMENT was made on Sept. 2 of the election of Frank R. Phillips as vice-president of the Duquesne Light Company, Pittsburgh, Pa., and of the appointment of William T. Rossell to succeed Mr. Phillips as general manager of the Pittsburgh Railways. Mr. Phillips has been general manager of the Pittsburgh Railways since March, 1925, having served as mechanical and electrical engineer of the company prior to that time. He is one of the best posted as well as one of the best known figures in the electric railway industry. After completing his education in Cleveland in 1894 he became master mechanic of the Cleveland Railway, a position he held until he went to Pittsburgh in the fall of 1909 to assist in the development of the street cars in that city.

Prior to Mr. Phillips' advent at Pittsburgh, the cars of the Pittsburgh Railways were of wood. His problem was to develop a car which would be lighter in construction and yet maintain the same strength and speed of the heavier car. His first achievement was the low-floor steel car operated with pony trucks and so-called baby motors. This type went into service in 1910, but was followed a year later by another similar car. Both of these proved less costly in construction and more economical in operation than the types which had preceded them.

He also extended the shops of the company so that every type of repair could be made by the company's own employees with a minimum of time lost from operation by the car. In 1910 Mr. Phillips was made superintendent of equipment, a position he filled until July, 1923, when he was made acting general manager for the receivers following the death of P. N. Jones. Upon the lifting of the receivership on Feb. 1, 1924, Mr. Phillips was made mechanical and electrical engineer and was also appointed the representative of the company to the Traction Conference Board.

Mr. Phillips was active in the work of designing the first efficient double-deck electric car in the country, placed in service in Pittsburgh in 1917, and in 1917 he designed a low-floor, high-speed, all-steel interurban car of a type which has since been made standard on the Pittsburgh Railways' lines. He was also active in the construction of the new cars which have recently

F. R. Phillips

W. T. Rossell

been placed in service in Pittsburgh, including the one-man cars and those used in multiple operation.

Mr. Phillips has become nationally known through his activities in the American Electric Railway Association, in which he served on many important committees. He has recently been re-elected president of the Pennsylvania Street Railway Association, and is past-president of the American Electric Railway Engineering Association.

WILLIAM T. ROSSELL

Mr. Rossell was born in Memphis, Tenn., and was educated at Staten Island Academy, Staten Island, N. Y., from which he was graduated in 1904. Later he entered the United States Military Academy at West Point. In August, 1908, he became assistant engineer of track and structures for the Cincinnati Traction Company and the following year was connected with the York Manufacturing Company, York, Pa.

In October, 1909, he returned to the Cincinnati Traction Company, where he remained until 1916, when he became superintendent of tracks and structures for the Cincinnati, Newport & Covington Railway, operating out of Covington, Ky.

Following his discharge from the army in June, 1919, as a captain of engineers, Mr. Rossell returned to the Cincinnati, Newport & Covington Railway as superintendent of way and structures, in which capacity he continued until his appointment as superintendent of way of the Pittsburgh Railways in July, 1924. In March, 1925, Mr. Rossell was made general superintendent in charge of maintenance for the Pittsburgh Railways and served in that position until the present time.

Mr. Rossell is a member of the Pittsburgh Chamber of Commerce, Veterans of Foreign Wars and the American Electric Railway Association.

J. W. Knecht Superintendent at Grand Rapids

John W. Knecht has been appointed by L. J. DeLamarter, vice-president and general manager of the Grand Rapids Railway, Grand Rapids, Mich., to succeed J. C. Madigan as superintendent. The appointment is effective beginning Sept. 1. Mr. Knecht has been chief engineer of the railway since his return from service as engineer in the Navy Department during the World War. He first entered the service of the company in 1911 as draftsman. Mr. Knecht is a graduate of the engineering department of Michigan State College and during his summers while at college he worked for the railway.

H. E. Ross, formerly auditor of the City Railway, Dayton, Ohio, has recently severed his connection with that company.

H. F. Farnham, superintendent of construction of the Vermont Hydro-Electric Corporation and electrical superintendent of the affiliated Rutland Railway, Light & Power Company, Rutland, Vt., has resigned to become superintendent of the Pennsylvania Edison Company with headquarters at Easton, Pa.

Harry E. Cawood has recently been appointed superintendent of the Edmondson Avenue and Ellicott City lines of the United Railways & Electric Company, Baltimore, Md. He entered the service of the company in 1909 as a carman. Four years later he was made a dispatcher and held that position for three years. After that he served as street man for the line until his present appointment.

Walter F. Helmreich, for many years chief mechanical and electrical engineer with the Missouri Public Service Commission, has resigned to become manager of the Capital City Water Company, Jefferson City. Mr. Helmreich was born in Cooper County, Missouri. He graduated from the Missouri State University with a master's degree in both mechanical and electrical engineering, taught in the David Rankin, Jr., School of Mechanical Trades, St. Louis, for six years and was assistant mechanical and electrical engineer to the Arkansas Public Service Commission for one year prior to his connection with the Missouri Public Service Commission.

Stewart W. Dubee, formerly assistant engineer of the Grand Rapids Railway, Grand Rapids, Mich., has been promoted to engineer of way and structures, effective Sept. 1.

Hurley M. Taylor, Decatur, Ill., has been appointed to succeed Charles H. Robinson, whose resignation as master mechanic in charge of railway equipment for the Bloomington & Normal Division of the Illinois Power & Light Corporation was noted in the ELECTRIC RAILWAY JOURNAL of July 17. Mr. Taylor has been connected with the Illinois Traction System for the past fifteen years and had been located at St. Louis, Granite City and Peoria for various periods before going to Decatur in 1923. For a number of years he was employed by the Pacific Electric Railway at Los Angeles, Cal.

W. E. Bann, purchasing agent and auditor of the Southwestern Gas & Electric Company, Texarkana, Ark., has been named general manager of the company's Texarkana Division, to succeed W. L. Wood, Jr. Mr. Bann's whole business life has been spent in the service of this company, of which he is now manager. He began his work there on Nov. 1, 1904, as a messenger and collector. Later he became a clerk and stenographer and gradually worked his way up through the various stages until he was appointed purchasing agent and auditor eight years ago. When Mr. Bann started with the company he was one of less than fifteen employees; now there are 165.

Edward A. Evans has been retained as consulting engineer of the Quebec Railway, Light, Heat & Power Company, Quebec, Que.

G. R. Davidson, for six years connected with the publicity department of the British Columbia Electric Railway Company, Ltd., Vancouver, recently resigned to enter the financial field. He has been succeeded by **Walter S. Hudson.**

Obituary

P. F. Sullivan

Patrick F. Sullivan, long identified with electric railway interests in Massachusetts, died suddenly, on Aug. 29, at Sunapee, N. H.

Mr. Sullivan was not only an exceptional street railway officer and developer; he was a financier, a generous citizen, kind and sympathetic, and a speaker of extraordinary ability. He knew the railway business from the carhouse to the president's chair, for he had been in all the positions along the line. A remarkable thing about him was his memory. Dealing with railway financing before the legislative bodies, or public authorities, or in the New England Street Railway Club, he could speak entertainingly for hours, if need be, and accurately handle an abundance of figures without ever referring to a written note. Few other men in New England enjoyed a popularity so widespread among operators of electric lines as did Mr. Sullivan, and certainly no one can claim a more intimate part in the organization and development of electric railways there.

Patrick Sullivan was not cast in the common mold. In some respects he was the personification of Old Man Graham, made famous by George Horace Lorimer in his "Letters of a Self-Made Merchant to His Son." He had the knack of turning a phrase that was trenchant but never vitriolic. He was also able to recognize similar ability in others. He adhered strictly to his own motto: "Do a little bit more than you are expected to do." Mr. Sullivan's personality made him a good public relations man without any external help, but it is well to recall that he was one of the first executives to go in for better public relations on business lines. To this end he retained Thomas Dreier, a man unusually well qualified to encourage friendships already made and to foster new ones. Dreier had the title of assistant to the president and did the work, but Sullivan was the driving force. It is only eight years since Dreier perpetrated his famous screed "The Asininity of Trying to Get Blood Out of a Turnip," likewise his "When the Mark Twains Become Buffalo Bills," but these and other things done on the Bay State under the régime of Mr. Sullivan now appear startling in their daring and originality.

It was while engaged in newspaper activities in the early days after his arrival in the United States that Mr. Sullivan became interested in city transportation questions. With several prominent Lowell citizens he organized a railway in Lowell in competition with the old company already installed there. This new company soon won the confidence of the people and later, in 1891, absorbed the older company, Mr. Sullivan becoming paymaster and an important member of the board of directors.

His relations with the force employed won him a strong place in their confidence and affection and soon obtained for him the post of general manager of the consolidated company. In 1899 the consolidation of the state lines into what is known as the Massachusetts Electric Companies took place and Mr. Sullivan became general manager in charge of 650 miles of tracks, carrying 70,000,000 passengers annually and employing 7,000 men. His activities increased measurably after that.

Born in Cork, Ireland, on March 16, 1856, he came to America with his parents in 1873. Soon thereafter he entered upon the career already partially reviewed, which included a wide and valuable experience in all the departments of railway operation from carhouse duties in the horse-car days to participation in electric railway mergers.

Mr. Sullivan was an ex-president of the old Bay State Railway, ex-president of the Newport & Fall River Street Railway, director of the Old Colony Trust Company, Boston; director of the Nashua Street Railway, Nashua, N. H.; ex-president of the Boston & Northern Street Railway, active in banking and insurance fields and interested in the advancing of civic and public welfare interests in his home city of Lowell.

Claude F. Chard, for several years district sales manager at Cleveland of the Austin Company, engineers and builders, that city, was killed in an automobile accident on Aug. 13. Before his connection with the Austin Company in 1918 Mr. Chard was with Westinghouse, Church, Kerr & Company, New York. He was graduated from Purdue University in 1910. He was a member of the Triangle Fraternity and of the Cincinnati Club of Cincinnati.

William H. Elliot, head of the Elliot Frog & Switch Works, East St. Louis, Ill., died in Green Bay, Wis., on Aug. 15, after several days illness. Mr. Elliot had been connected with the Elliot Frog & Switch Company since May, 1882, when he graduated from Kemper Military Academy at Boonville, Mo. Until two years ago he was president of the company, which in December, 1924, was taken over by the Ramapo Ajax Corporation. He was elected a director and vice-president of that corporation and placed in charge of the East St. Louis plant. Mr. Elliott was 62 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Waugh Takes Over Rico

The Waugh Equipment Company, Chicago, announces that it has acquired all of the outstanding capital stock of the Railway Improvement Company, New York. It will amalgamate the two companies at once and operate the combined companies under the name of the Waugh Equipment Company, maintaining its offices in the Peoples Gas Building, Chicago, and Pershing Square Building, New York. With the acquisition of the Railway Improvement Company, the Waugh Equipment Company acquires all of the well-known Rico products, used extensively throughout the country on practically all electric street railways and steam railroad electrifications.

R. J. O'Brien, formerly general manager of the Waugh Equipment Company, has been elected vice-president. H. N. Ransom, W. M. Roche, O. L. Downs, Henry Wiegand and G. F. Ferguson of the Rico sales department have been added to the Waugh company sales forces and Col. L. M. Clark of the Railway Improvement Company has been attached to the Waugh company engineering department.

Electric Heat Applied to Thermit Welding

Electric heat has now been applied in connection with thermit welding. The Metal & Thermit Corporation, Jersey City, N. J., has introduced General Electric heating units on its track welding equipments for the purpose of assisting the vaporization of the kerosene oil, which is used for preheating the work.

The oil is passed through the heating unit and is then mixed with compressed air at a pressure of approximately 1 lb. Thence it passes through a rubber hose to the torch used in applying the heat to the rails.

The heating unit also acts as a resistor. The equipment is electrically operated from the standard 550/600-volt trolley circuit, and the group of two heating units is connected in series and placed in series with the 230-volt, direct-current motor which drives the compressor. With this arrangement a snap switch can be used to start the motor, for the heating units have sufficient reactance to hold back the inrush of current until the motor comes up to speed.

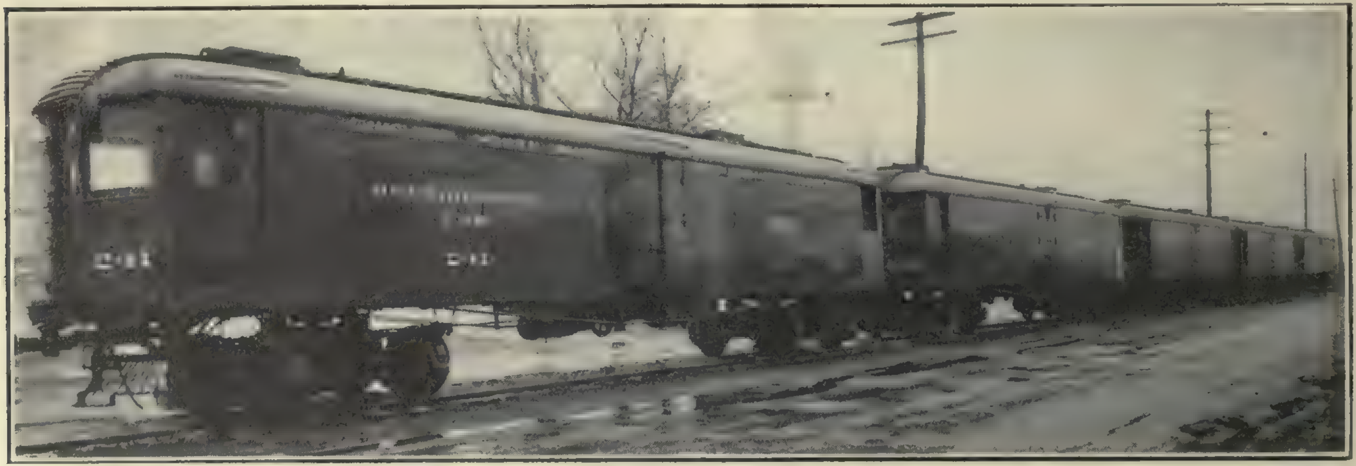
Refrigerator Service on the North Shore

Delivery of perishables and cold storage products by electric refrigerator cars was started on Aug. 23 by the Chicago, North Shore & Milwaukee Railroad—the North Shore Line—connecting Chicago, Waukegan, Racine, Kenosha and Milwaukee.

The cars being used in this type of merchandise despatch service were especially built for the North Shore Line. They are equipped with ammonia compressor, ammonia condenser and water cooling apparatus, all of which is operated by electricity. Thermostatic control apparatus maintains an even temperature at all times, while the air-cooling method of refrigeration insures cleanliness and preservation of shipments in first-class condition during transit.

Each of the five cars in the initial service is equipped with control and air brake apparatus and control cabins at each end. They are finished in the style of the regulation North Shore Line passenger coaches, the absence of windows and passenger entrances being the only deviation in exterior appearance. The cars are being operated in conjunction with the regular merchandise despatch service of the North Shore Line.

That the cars would be placed in



These Units Will Make Possible a Highly Effective Express Refrigerator Service Between Chicago and Milwaukee service soon was noted in the ELECTRIC RAILWAY JOURNAL for Aug. 21, page 328. The equipment was built by the Phoenix Ice Machine Company, Cleveland, Ohio.

Welding Exposition to Be Held in November

An international welding exposition will be held in connection with the annual fall meeting of the American Welding Society in Buffalo, N. Y., Nov. 17-19. A feature of the exposition, the purpose of which is to display new developments in welding apparatus and supplies, will be an exhibit of a large variety of welded products.

Plans for the annual meeting include technical discussions and inspection trips, notably an excursion to Niagara Falls. The list of exhibitors includes, among others, the following companies: John A. Roebling's Sons Company, Metal & Thermit Corporation, General Electric Company, Una Welding & Bonding Company, American Brass Company, Westinghouse Electric & Manufacturing Company.

Westinghouse Electric Makes Unprecedented Sales

Indication that the current fiscal year may establish a record in the sales of the Westinghouse Electric & Manufacturing Company is found in the company's recent report of billings of $61,186,127 for the period from March 31 to July 31, 1926. This is an increase of $10,135,114 over billings in the corresponding period of 1925.

In these four months the company earned a net income of $5,567,022, which amounts to $2.34 per share of its outstanding stock. Since the trend of sales is usually upward during the fall and winter, it is predicted by competent observers that the yearly income will run around $7 a share, which is a substantial increase over the high figure of $5.96 a share which the company earned last year.

Kuhlman Company Builds Wheeling Cars

The fifteen new cars now being received by the Wheeling Public Service Company, Wheeling, W. Va., were supplied to that company by the G. C. Kuhlman Car Company, Collinswood, Ohio, so ELECTRIC RAILWAY JOURNAL is advised, and not by the St. Louis Car Company, as was inadvertently stated in the issue for Aug. 28. The incorrect statement was based on news sources which had hitherto proved reliable.

Details of Milwaukee Track Reconstruction

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has started work extending its double track on First Avenue one mile from Oklahoma Avenue to Euclid Avenue, thence south to Morgan Avenue, at a cost of $40,000. The Holton-Mitchell line will be extended on Forest Home Avenue from 26th Avenue to 29th Avenue at a cost of $25,000. Double tracks will replace the single track line on 35th Street between Clybourn and State Streets. This reconstruction work will cost $59,000. Ready-made tracks in 60-ft. lengths with rails and ties securely spiked together will be used on the 35th Street track laying job. These rails are delivered on flat cars and placed in position by electric derricks. To carry the method a step further, a new track building machine is being constructed at the company's shops. Extension of the Center Street line from 51st Street to Lisbon Avenue has been completed at a cost of $45,000.

North Shore Line Has New Freight Handling System

An elaborate system for handling freight by means of electric trailers will be installed by the Chicago, North Shore & Milwaukee Railroad in both its Chicago and Milwaukee terminals. Twenty-two 8-ton capacity Interlocking semi-trailers, with 7-ft.x17-ft. metal container bodies, together with twenty-six 8-ton Interlocking chassis to convert a like number of the company's present trailers into the Interlocking type, have been purchased from the Trailmobile Company, Cincinnati, Ohio. The trailers will collect the freight at one terminal, will be run over special inclined runways onto flatcars equipped with holding-down apparatus especially designed for this purpose, and will then be transported to the other terminal of the railroad. The advantages of this trailer system are expected to be a greater convenience in handling less-than-carload shipments of freight, and a considerable saving in time and money by eliminating reloading at the terminals.

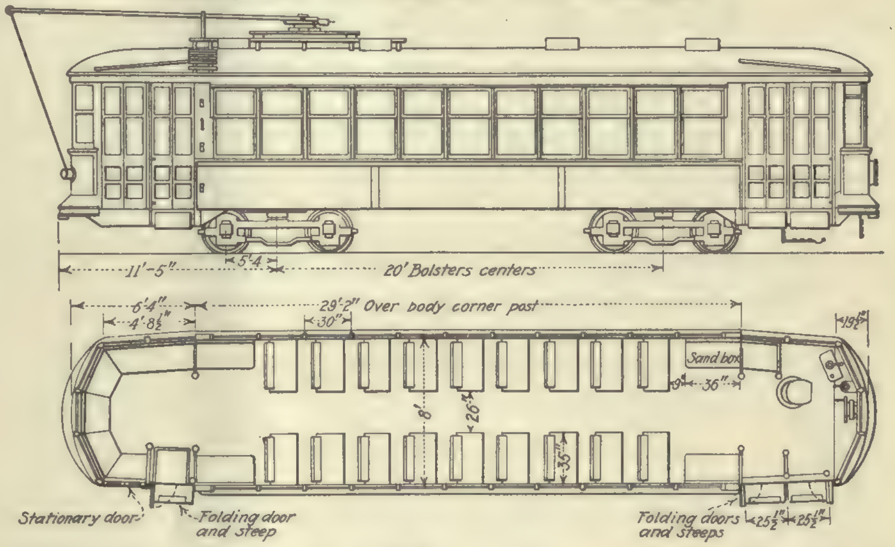
White Motors Opens Seventeen New Stations

The service department of the White Motor Company this year has seen the greatest expansion in its history, with seventeen completely equipped service stations newly established in various parts of the country. Several more are to be opened before the end of the year. There now are more than 80 company service stations in the United States and Canada, exclusive of those operated by about 500 dealers. Each station is equipped and its employees are trained to build a complete new White bus or truck if necessary.

Union Switch & Signal Gets Interborough Order

The Interborough Rapid Transit Company, New York, has ordered electric pneumatic interlocking devices with 75 levers, including 21 automatic train stops and 72 signals from the Union Switch & Signal Company.

Safety Cars for Alabama Power Company



On July 15 the Alabama Power Company of Birmingham, Ala., placed an order with the Perley A. Thomas Car Works, High Point, N. C., for three double-truck, single-end safety cars. These cars are to have a seating capacity of 53 and will weigh 32,000 lb. each. Delivery is expected in eleven weeks from the date when the order was placed. Principal specifications follow:

Length over bumpers	42 ft. 10 in.
Length of body	29 ft. 2 in.
Width over all	8 ft. 4½ in.
Height, rail to trolley base	11 ft. 3 in.
Body	All steel
Interior trim	Cherry
Roof	Arch
Air brakes	Westinghouse
Axles	Taylor steel, best quality
Bumpers	Steel channel
Buzzers	Electric Service Supplies
Car trimmings	Polished bronze and aluminum
Control	Westinghouse K-35-KK
Curtain fixtures	Curtin Supply No. 88 ring fixtures
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism	National Pneumatic
Fenders	H-B life guards
Finish	Duco
Gears	Taylor Electric Truck, solid
Hand brakes	Peacock Staffless
Heaters	Consolidated Car Heating, cross-seat type
Headlights	Crouse-Hinds, type WDF
Headlining	Agasote
Journal boxes	MCB, 3¾ in. x 7 in.
Lightning arresters	Westinghouse type K
Motors	Four Westinghouse 510-E, 35 hp.
Registers	Ohmer
Safety devices	Safety Car Devices
Sanders	Ohio Brass
Sash fixtures	Curtain Supply (metal sash)
Seats	Hale & Kilburn, No. 108 stationary
Seating material	Genuine leather
Slack adjusters	American type E
Step treads	Kass
Trolley base	Ohio Brass
Trucks	Taylor Electric Truck
Ventilators	Railway Utility
Wheels	Rolled steel

Metal, Coal and Material Prices

Metals—New York	Aug. 31, 1926
Copper, electrolytic, cents per lb.	14.40
Copper wire, cents per lb.	16.25
Lead, cents per lb.	8.90
Zinc, cents per lb.	7.75
Tin, Straits, cents per lb.	65.875
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.425
Somerset mine run, Boston, net tons	1.975
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.625
Central, Ill., screenings, Chicago, net tons	1.50
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.90
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.25
Turpentine (bbl. lots), N. Y., per gal.	$0.94

Rolling Stock

British Columbia Electric Railway, Vancouver, B. C., received eight new street cars in July and was informed that its four new two-car trains would arrive shortly. The new cars, which will be placed on the Dunbar-Hastings East service, are of unusually large capacity, and have exceptionally powerful motors.

Los Angeles Railway, Los Angeles, Cal., has ordered three double-deck Fageol buses equipped with air brakes. These units will be used in city operation.

Eugene Street Railway, Eugene, Ore., has purchased three 29-passenger, city type Mack buses for operation between Eugene and Springfield, a distance of 3.6 miles, at a 15-cent fare, 25 cents a round trip. These are the first buses purchased by this company. Eighteen daily trips per bus will be made. Buses will replace street cars formerly operated between these two points.

Pittsburgh Railways, Pittsburgh, Pa., anticipates delivery of its 50 new cars beginning in October. The units are of the one-man, two-man type and will be used in city service in Pittsburgh. They are being built by the Standard Steel Car Company. Each car will seat 52 passengers. Some of the principal specifications follow:

Weight	38,000 lb.
Length over all	45 ft.
Width over all	8 ft. 1¼ in.
Height, rail to trolley base	10 ft. 10¾ in.
Body	All steel
Interior trim	Cherry
Headlining	Haskelite
Roof	Monitor
Air brakes	Westinghouse
Axles	4 in.
Bumpers	Hedley anti-climbers
Car signal system	Faraday
Car trimmings	Statuary bronze
Conduits and junction boxes	Crouse-Hinds
Control	K-43-G
Couplers	Van Dorn
Curtain fixtures	Curtain Supply Co.
Curtain material	Fabrikoid
Destination signs	Illuminated
Door operating mechanism	National Pneumatic
Fare boxes	Cleveland No. 5
Finish	Cellulose lacquer
Wheelguards	Root lifeguard
Gears and pinions	Helical
Hand brakes	Peacock
Heater equipment	Consolidated Car Heating
Headlights	U. S.
Journal boxes	Symington 3¾ in. x 7 in.
Lighting arresters	Westinghouse K-3
Motors	Four Westinghouse 514-P
Registers	International
Sanders	Nicholas-Lintern air
Sash fixtures	Dayton Mfg. Co.
Seats	Transverse and longitudinal
Seating material	Rattan
Slack adjuster	Pin type
Springs	Elliptical
Step treads	Feralun
Trolley catchers	Ideal
Trolley base	Nuttall
Trucks	Arch bar
Ventilators	Peerless and Perry
Wheels	26-in. forged steel
Special devices	Rico hand straps, porcelain enameled stanchions

Track and Line

Louisville Railway, Louisville, Ky., is adding some trackage to its old power house, connecting switches at Campbell and Finzer Streets, west to Shelby, which will enable Broadway cars to operate a little over ½ mile east of Second Street, to a loop running around four sides of a block, and back into Broadway. This arrangement should relieve congestion at Second Street materially.

Lincoln Traction Company, Lincoln, Neb., has ordered nine main line automatic box signals to expedite the single-track operation of its suburban lines. The equipment was obtained from the Nachod & United States Signal Company of Louisville, Ky., at a cost of $8,000. It is expected that the new signals will speed up traffic and also furnish a maximum of safety in time of storm and whenever visibility is poor.

San Diego Electric Railway, San Diego, Cal., began service on the new Woolman Avenue extension on July 20. The new line is about 1 mile long and cost more than $88,000. In addition to the major extensions and reconstructions, the company has undertaken a great amount of maintenance work all over the system and officials have indicated that their maintenance forces are to be augmented so that even more of this work can be done in the future.

Power Houses, Shops and Buildings

Eastern Massachusetts Street Railway, Boston, Mass., has awarded contract to Robert A. Doyle, 32 Cauldwell Crescent, Lynn, Mass., to remodel its brick building at 53 Mason Street, Salem.

Asbury Park, N. J.—The Eastern New Jersey Power Company and its subsidiaries, the Coast Cities Railway, operating a shore traction system, and the Atlantic Coast Transportation Company, running single and double-deck buses, will occupy the basement and first three floors, including the mezzanine, of an eleven-story office building on Bangs Avenue and Emory Street. The building will be fireproof in every respect and will cost about $850,000. It will be ready for occupancy April 1, 1927.

Pacific Northwest Traction Company, Seattle, Wash., subsidiary of the Puget Sound Power & Light Company, awaits only the passage of an ordinance by the City Council concerning trackage rights adjoining the site on the south side of Stewart Street, between Eighth and Ninth Avenues, to begin the construction of the proposed stage terminal depot. The building will be fireproof reinforced concrete, 63 x 260 ft., two stories high, adjoining a roofed concourse 260 ft. long equipped with tracks for interurban trains and loading platforms capable of handling twelve stages at one time.

Trade Notes

Bridgeport Brass Company, Bridgeport, Conn., announces the removal of its New York office from the Pershing Square Building to the Farmers Loan & Trust Company Building, Suite 407, 475 Fifth Avenue.

Commercial Truck Company, Philadelphia, Pa., has purchased all assets, including machinery, equipment, trucks completely or partly completed, parts, drawings, dies, etc., and all patents of the Electruck Corporation, manufacturer of electric street trucks. The Commercial company is now able to supply any services that may be required on the products of the Electruck Corporation.

O. M. Edwards Company, Syracuse, N. Y., furnished the brass sash for the 50 cars now being built by the Canadian Car & Foundry Company for the Montreal Tramways. An article on these cars appeared on page 293 of the issue of this paper for Aug. 21, 1926.

Ross H. Rathbun has been appointed sales manager of the Ross Heater & Manufacturing Company, Inc., Buffalo, N. Y. Mr. Rathbun has a wide experience in the electrical industry. He was formerly in charge of the central station department of the Westinghouse Electric & Manufacturing Company.

Morton Manufacturing Company, Chicago, Ill., manufacturer of the Acme line of railway appliances, has just announced the appointment of Robert P. Mosier as manager of foreign sales. Mr. Mosier has had considerable sales experience, following which and until recently he has been connected with the consular service of the United States. For these reasons his service will undoubtedly be valuable in strengthening the sales department of the Morton company. Production capacity of the company's Chicago plant has been greatly increased recently by the erection of a new addition, providing 50,000 sq.ft. more floor space into which machinery and other forms of equipment are now being moved.

New Advertising Literature

Ludlum Steel Company, Watervliet, N. Y., has just issued the second edition of the Tool Steel Handbook. It describes in detail carbon, alloy, rust and heat-resisting steel, their use and methods of treatment.

General Electric Company, Schenectady, N. Y., has issued bulletin GEA-424, entitled "Distribution and Small Power Transformers." In addition to complete information on small power transformers for industrial purposes there is included information on large power transformers and outdoor substations suitable for railway purposes.

The Modernization Doctrine Includes SAFETY!

Modernization in car design and operation leads to comfort, speed, dependability and SAFETY.

Insure your schedules against interruptions caused by accidents due to failures of hand brakes by calling for

Peacock Staffless Brakes

in the specifications of your modern equipment

The
Peacock
Staffless

They occupy minimum floor space. Their power is at least three times as great as any ordinary type of hand brake. They have a demonstrated capacity for winding in 144 inches of chain—so that neither slack chain nor worn brake shoes can prevent effective braking. It is such qualifications that make Peacock Staffless Brakes especially adapted for the modern car.

Send for additional information or estimates.

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
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PHILADELPHIA CHICAGO SAN FRANCISCO

STONE & WEBSTER
Incorporated
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ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
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SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
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CHICAGO NEW YORK SAN FRANCISCO

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
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Engineers and Contractors SYRACUSE, N. Y.

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INCORPORATED
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Gardner F. Wells Albert W. Hemphill
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INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

A. L. DRUM & COMPANY
Consulting and Constructing Engineers
VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
230 South Clark Street, Chicago, Ill.

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

THE BEELER ORGANIZATION
ENGINEERS AND CONSULTANTS
Traction - Traffic - Equipment - Power Investigations
TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
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Byllesby Engineering & Management Corporation
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Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

DAY & ZIMMERMANN, INC.
ENGINEERS
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VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

WALTER JACKSON
***Consultant* on Fares and Motor Buses**
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

KELKER, DELEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Rates Traffic Surveys
111 W. Washington Street, Chicago, Ill.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
CHICAGO ST. LOUIS

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President

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Engineering and Management, Construction,
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1904 Citizens National
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Phone:
Hanover: 2142

NEW YORK
49 Wall Street

THE P. EDWARD WISH SERVICE

50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Coin Counting and Sorting Machines

FARE BOXES

Lever-Operated and Slip Change Carriers

The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

Gets Every Fare

PEREY TURNSTILES
or PASSIMETERS

Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

UNA

RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio.

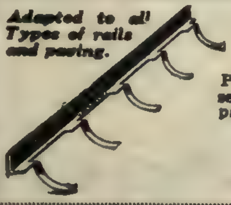
ERICO

BRAZED **Rail Bonds** ARC WELD

Portable Arc Welding Outfits

The Electric Railway Improvement Co.
Cleveland, Ohio

Adapted to all Types of rails and paving.



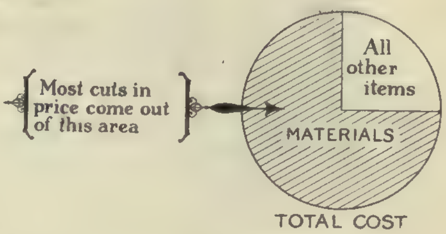
GODWIN
Steel Paving Guards

Proven by service to economically prevent seepage and disintegration of street railway paving.

Write for Illustrated Catalog No. 20

W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

ACME



Just Figure It Out for Yourself

Approximately, 60% to 80% of the cost of Magnet Wire represents MATERIAL. The remainder includes all other items: labor, overhead, inspection, packing, selling.

Concessions in price, to be attractive, must come out of the MATERIAL — and this cannot help but result in insulation that is not safe, either because of insufficient amount or inferior quality.

Buyers should consider safety first and price second. The consequences of doubtful insulation sooner or later come home to roost on the desk of the man who sacrifices safety for price.

Buy with FORESIGHT. Pay a few cents more if necessary. The good word of a satisfied customer remains after the price is forgotten.

Acme Magnet Wire measures up to the rigid tests of the various electrical societies and, for years, has been living up to these standards in innumerable electrical installations in the country. May we send you Bulletin 3J, telling the story in detail?

Acme Wire Products

The Acme Wire Co., New Haven, Conn.

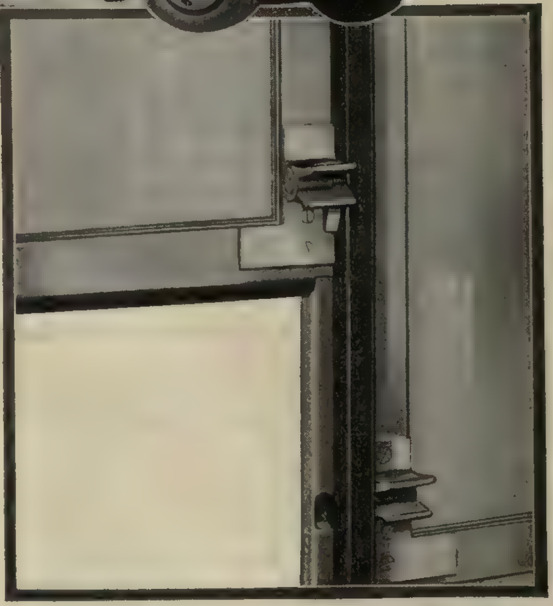
Branches at

New York, 52 Vanderbilt Ave.
Boston, 80 Federal St.

Chicago, 427 West Erie St.
Cleveland, Guardian Bldg.

WINDOWS DO MAKE A DIFFERENCE

Fageol Safety Coach for Capitol District Transportation Co., Albany, N. Y., using Edwards Metal Sash.



Built for Passenger Comfort

Comfort expressed in terms of ample vision, of windows that open easily and close safely, of air-tight protection from wind, rain, and cold. Comfort in the complete lack of nerve-racking window rattles!

This is the comfort which Edwards Metal Sash brings to bus passengers.

To the bus operator, Edwards Metal Sash brings ease of maintenance through effortless window cleaning, and economy though durability and long life under the most difficult operating conditions.

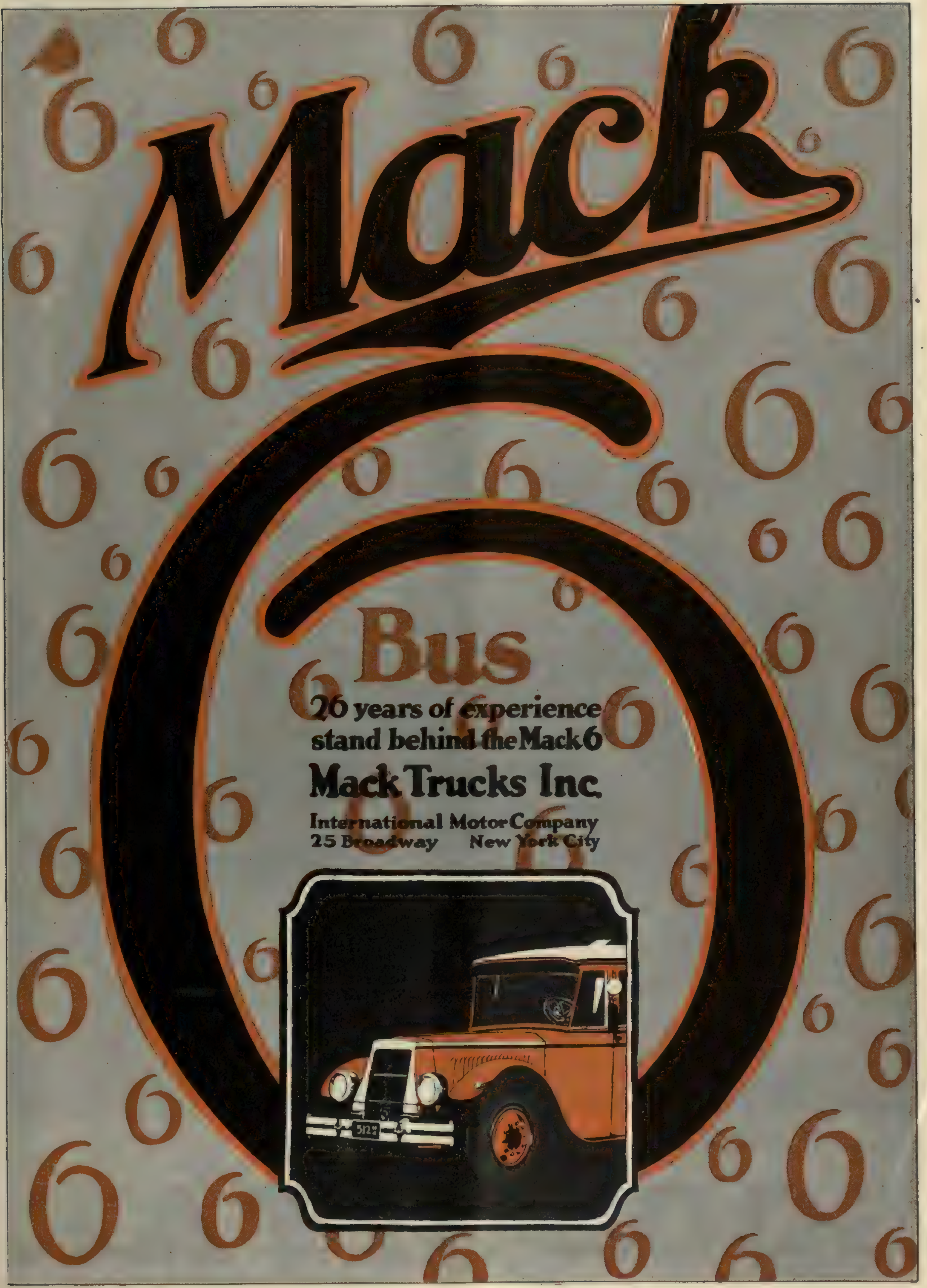
Bus operators will be interested in our catalog, and the list of prominent body builders who use Edwards Metal Sash. Both will be sent on request.

EDWARDS
TRADE PAOWNYC MARK

O. M. EDWARDS CO. SYRACUSE, N. Y.

Canadian Representatives:
Lyman Tube & Supply Co., Ltd., Montreal and Toronto

EDWARDS Metal Sash



Mack

6

Bus

26 years of experience
stand behind the Mack 6

Mack Trucks Inc.

International Motor Company
25 Broadway New York City

Goodyear-equipped motor coach of the Red Star Transportation Company, Lexington, Kentucky

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

"We recommend them for Lower Cost Per Mile"

The Red Star Transportation Company, of Lexington, Kentucky, operates through the Blue Grass country for a radius of 90 to 105 miles around Lexington.

Its buses travel south to Harrodsburg, Danville, Somerset, Richmond, Berea, Mt. Vernon and Corbin, and north as far as Cincinnati—on Goodyear Pneumatic Bus Tires.

"We have just recently removed some Goodyear 32x6 Bus Tires, from our No. 50 Studebaker bus, that have delivered over 35,000 miles," writes Mr. Roger H. Swope, Vice President and General Manager.

"We have had two of these tires retreaded, which ought to give us a great many thousand miles more.

"We have been receiving exceptionally good mileage on Goodyear Bus Tires—so much so that we are standardizing with Goodyears on all our fleet of 45 Studebaker buses. We feel justified in recommending Goodyear Bus Tires to any operator who wants to lower his cost per mile tire expense."

* * *

Goodyear Tires, made with that extra-durable, extra-elastic fabric developed by Goodyear for Goodyear Pneumatic Tires—SUPERTWIST—provide the last word in active, tractive, secure and long-wearing service at low tire cost per mile.

Only Goodyear Tires are made with SUPERTWIST—yet they cost you no more.

More people ride on Goodyear Tires than on any other kind

BUS TIRES

Made with SUPERTWIST

Light on the
Bus Braking
Question

The ABC's of
Bus Brakes and Braking Systems

Braking Power

The previous articles have all pointed definitely to the need of a braking power other than muscle.

No driver has sufficient muscle power to take advantage of the traction of all wheels. If his strength be multiplied by levers to the point where it is effective on all wheels, the travel in the mechanism at the point of application is so reduced that almost daily adjustments are necessary. Also a sufficient amount of "self-energization" to augment his strength is uncontrollable and gives erratic braking.

For self-equalization, too, power brakes are essential. No muscle power brake with its levers, pullrods, and cams can stay equalized. To attain this, power must be used; power that can be applied INSIDE the brake drum itself, and not transmitted through a system of levers and rods.

Fatigue is an important element that operators are coming to appreciate more and more, as vehicles increase in weight, speeds increase, and dense traffic necessitates more frequent stops. Repeatedly stopping a heavy vehicle all day long saps the energy of a driver and decreases his alertness. It requires too much of his strength. Stopping should require no more strength than accelerating. Power Brakes is the only answer.

Compressed Air is the universal power-braking agent. The power obtainable with it is adequate for any braking job; it is sure and positive in operation, it is flexible, and it is economical. Properly controlled and applied, nothing else has ever been found to equal it for all-around braking efficiency (witness its universal use on steam and electric railways).

Compromises will not satisfy the requirements. Real Power Brakes are needed, and the bus industry—manufacturers and operators as well—are rapidly coming to them. Safety, reduction of driver fatigue, strain upon the chassis and body, tire wear, and brake maintenance cost make power brakes not only necessary but profitable to the operator.

This is the sixth of an informative series on Bus Brakes. The series consists of:

A—What Brakes Must Do.
B—How many wheels should brakes go on?
C—Self-equalization and brake adjustments.
D—Curing the skid.
E—Metal to metal or molded linings—which?
F—Braking Power.
G—Compressor Mountings and Drives.
H—Compressor Cooling.
I—The Control Valve.
J—Maintenance on Different Types.

The above topics will appear in the above order. Address any comments, suggestions, or requests for advance information to:

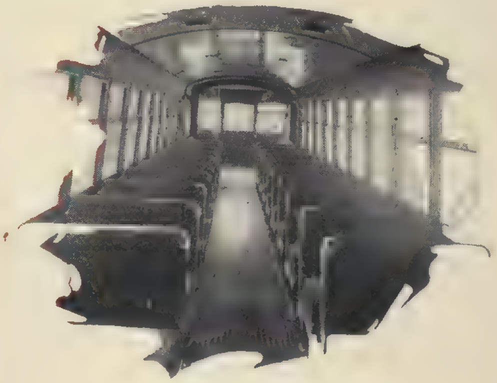
The Christensen Air Brake Company
6513 Cedar Avenue, Cleveland, Ohio

Christensen

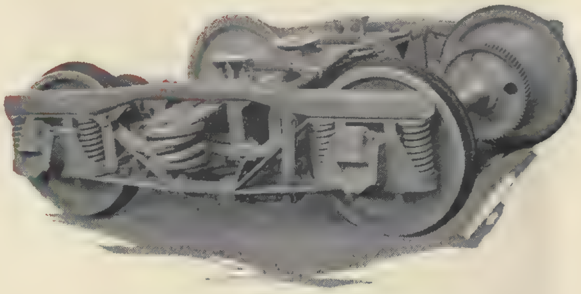
Let us fight competition
on a basis of
passenger preference—!

—using New cars, built to
- - - - - with a

Attractive Cars Attract Riders



The Interior Design is Balanced to Fit Character of Service



City or Suburban Truck, Balanced for Easy Riding and Low Maintenance

THERE was a time,—it seems long ago now,—when the electric railway company's sales problem was merely a question of "taking orders." Public transportation was a monopoly. A majority of the average railway's patrons were "have-to" riders. Hence passenger preference and passenger comfort found small place in the operating scheme.

Things have changed,—very decidedly. There is competition these days, and competition so effective that it has become serious.

What are we doing to turn the tables? How are we going to get the business back?

Cincinnati engineers have already given a logical and decisive answer.

By pooling the results of 10 years' consistent effort in modernization, by boldly breaking with precedent in design and construction, they have produced a series of NEW cars so striking in appearance, so comfortable, so easy riding and so thoroughly practical as to have been unfailingly successful on every one of the many installations made to date.

These Cincinnati NEW Cars have PROVED that the electric railways can "come back" stronger than ever, provided they meet present day transportation demand. And under the Cincinnati Principle of "balanced design" these results can be duplicated with equal or greater success on *your* property.

meet New conditions
New measure of success

A step ahead of the modern trend

—in earning power
—in low cost of operation
—in passenger preference

High Speed with Light Weight—the Result of Perfect Balance

Cincinnati New Cars are "balanced." They are balanced in their structural details, to assure light weight with low maintenance; "balanced" in their appointments and appearance to attract riders in a given class of service. And when mounted on Cincinnati-built trucks they form "balanced" transportation sales units designed in every detail to furnish transportation of maximum attractiveness at minimum cost.

The Cincinnati principle of "balanced" light weight car construction is particularly interesting because of the remarkable *certainty* of results which has characterized its application.

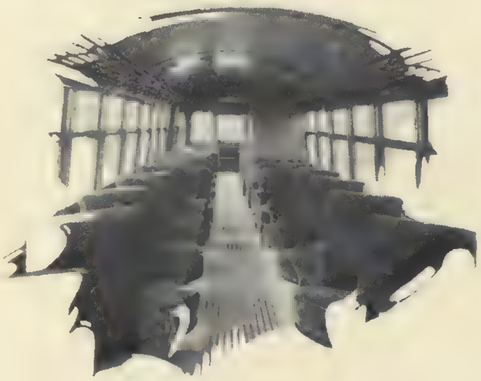
Cincinnati Cars are now in service on an impressive number of properties.

Their many practical advantages and strikingly attractive lines have already won comment—and patronage,—from one end of the country to the other.

Their light weight; their efficient NEW trucks and modern equipment have already shown savings up to 30% in operating cost.

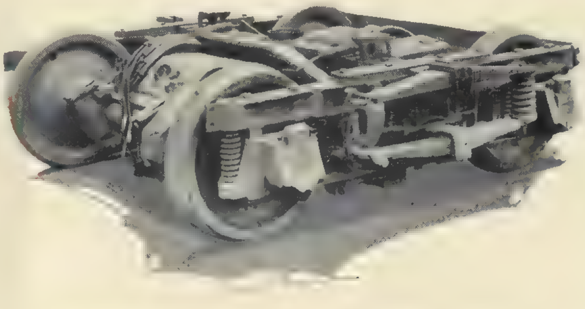
And the roads which operate them have without exception reported that New cars,—Cincinnati New Lightweight Cars, *do* pay and pay well.

Let us send you blueprints and further details. Cincinnati New Cars are available to meet your service conditions with but little need for special designing.



Parlor Observation Arrangement Offers Luxury and Comfort

CINCINNATI
New
CARS



"Quartered" Equalization Inaugurates New Era of Light Car Stability at High Speed

A step ahead of the *modern trend*

and **PROVED**

By the operating statistics of many Cincinnati, New Car operators—

All of these roads are "old timers" in the industry. And all of them have been operating Cincinnati NEW Cars long enough to have compiled authentic and practical operating data. In every case the results have proved beyond doubt that it pays and pays well, to modernize with light weight *NEW* cars, of *Balanced* design and built by *Cincinnati.*

All data is available to interested executives on request.

The Cincinnati Car Company
Cincinnati, Ohio

CINCINNATI
New
CARS

Gas Cars Invariably Timken-Equipped

Timken Bearings grew up with self-propelled transportation. Now the gas rail car, latest form of the self-propelled vehicle, is growing up on Timken Bearings. There is hardly a single make which is not thoroughly Timken-equipped.

The M. A. C. Rail Coach, built by the Skagit Steel and Iron Works, of Sedro-Woolley, Washington, employs Timkens in the clutch, transmission, wheels, and final drive. Under heaviest thrust, shock, speed and torque Timkens get more of the engine power onto the rails—smoothly, economically and consistently.

The utmost endurance is assured by Timken *POSITIVELY ALIGNED ROLLS,* Timken tapered design, and Timken rolling motion entirely on Timken-made steel. The usual effects of bearing wear—and most lubrication items—are eliminated from schedules and cost sheets. Every manufacturer and operator of gas cars can guide himself by Timken records in hundreds of thousands of miles of service, in every type of car.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

Technical information regarding bearing sizes and their mountings can be secured from the Timken Roller Bearing Service & Sales Company's Branches located in the following cities: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, Memphis, Milwaukee, Minneapolis, Newark, New York, Omaha, Philadelphia, Pittsburgh, Richmond, St. Louis, San Francisco, Seattle, Toronto, Winnipeg

TIMKEN *Tapered Roller* BEARINGS

Dragged from one location to another, it still stands the gaff.

Two years use—
without a bit of trouble

DURING the last two years considerable construction work has been done in this great middle west oil refinery. Addition has followed addition. And Super Service has played its part in this work.

The foreman in charge writes—"In the two years I have used Super Service Cords and Cables on Electric machinery in construction work, we have never had a single shut-down due in any way to their use."

A clean record made possible by the special process under which Super Service is built. Every foot is vulcanized in steel molds under tons of pressure—a special process used in the manufacture of no other wire.

A process that compresses the outer jacket of rubber into a tough, dense, yet flexible covering that protects the conductors from wear and abrasions and gives it many times the life of ordinary cables. It is absolutely waterproof and highly resistant to the action of oils and acids.

If you would like detailed information about these portable cords and cables with the long life, we will be glad to send you a catalog and price list.

9817

ROME WIRE COMPANY
Mills and Executive Offices: Rome, N. Y.
Diamond Branch: Buffalo, N. Y.

SUPER SERVICE
CORDS *and* CABLES
A ROME WIRE PRODUCT

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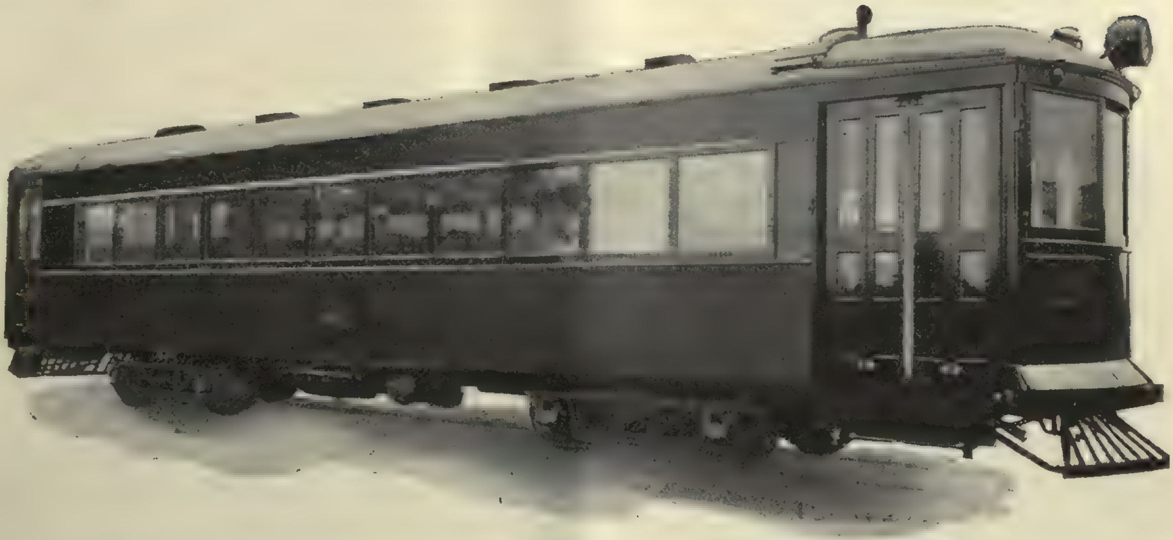
J. G. Pomeroy, Inc.
960 Folsom St.



MODERN LIGHT WEIGHT CARS

for replacing heavy type on city or interurban service

Typical of the trend toward light weights and more attractive designs, is the car illustrated, one of a number recently put in service in a midwestern city. Seating 46 passengers, and equipped with four 35 h.p. motors, and mounted on Cummings No. 62 trucks, the total weight of the car is 37,000 pounds.

These cars are arranged for double end, one-man or two-man operation. They are building up increased patronage by reason of their attractive appearance and comfort and their reduction in weight is making a saving in operating expenses. They replace two-man equipment.

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire-Cummings Mfg. Co.

111 West Monroe Street
Chicago

Gas-Electric Motor Coaches
Snow Sweepers and Plows
Light Weight City and Interurban Cars

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

FROM the smallest to the largest, many of the Chicago, North Shore and Milwaukee Railroad cars run on "STANDARD" Rolled Steel Wheels.

Rolled Steel Wheels

Quenched and Tempered Carbon Steel Axles

Coil and Elliptic Springs

STANDARD STEEL

WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK
HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.
SAN FRANCISCO
ST. PAUL, MINN.
PITTSBURGH, PA.

WORKS: BURNHAM, PA.

In Cincinnati—

a *permanent* foundation this time

The Cincinnati Street Railway Company this summer replaced the wood ties on Madison Road with Carnegie Steel Cross Ties, spaced 3 ft. center to center, and laid on the old concrete base.

The former track was laid in 1915—only eleven years of service. The new foundation is permanent—put down to stay. Temperature variations, water or decay will not affect it.

The initial cost of such construction has, in some cases, been less than that for wood ties.

Booklet, "Steel Cross Ties,"
will be sent at your request.

CARNEGIE STEEL COMPANY

General Offices - Carnegie Building - 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA

HASKELITE

The cars shown below are typical of the hundreds in use on the Chicago Surface Lines with HASKELITE roofs, headers and interior linings.

Time Proven Claims

When the use of HASKELITE in car roofs was first suggested, it was easy to prove the saving in weight. A pair of scales would do that. It was comparatively easy to prove its increased strength. Test pieces would demonstrate that. But time alone could prove the permanence and all around satisfaction of these modern roofs.

Time has passed. Hundreds of cars with HASKELITE roofs have gone in service and year by year have left their record. These records are the surest proof anyone could ask of the supremacy of HASKELITE roofs. Company after company has tried HASKELITE roofs and based on experience has ordered this material for more and more cars. The Chicago Surface Lines, for example, has 100 more cars under order with HASKELITE roofs, headers and corner panels. This is the third big order from this company in the last five years. A score of other early users are regular buyers today. The urgent demand for modernized equipment is speeding the day when the HASKELITE roofs will be the standard on electric railway cars and buses.

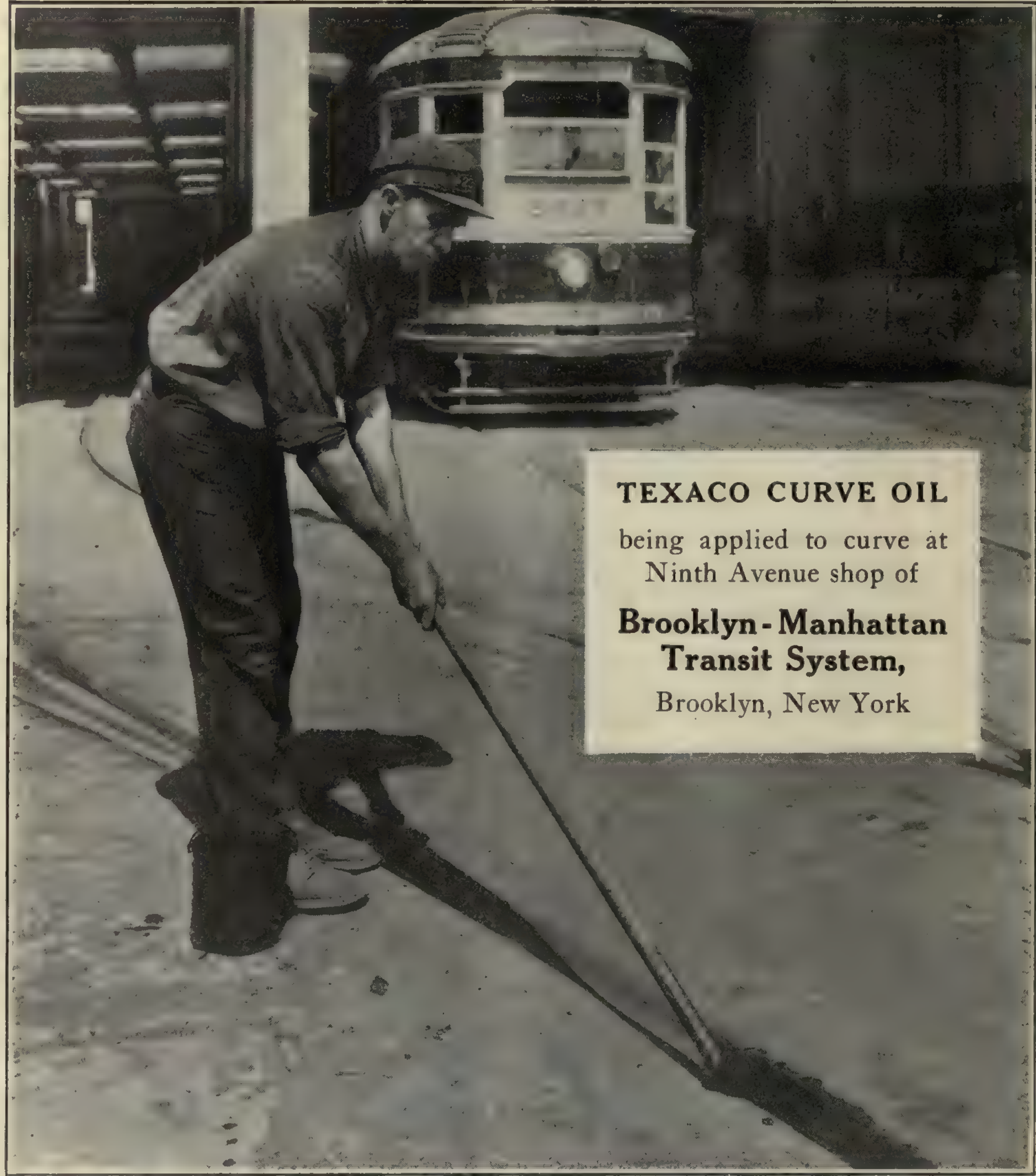
May we give you details of the experience of others with HASKELITE roofs, PLYMETL side panels, etc.?

HASKELITE MANUFACTURING COMPANY
133 W. Washington St., CHICAGO
Canadian Representatives: Railway and Power Engineering Corp., Toronto, Montreal and Winnipeg

PLYMETL, the armored HASKELITE, has proven its claim to supremacy for side panels. Resists indentation, reduces weight, takes fine finish, makes a quiet, well-insulated car.

PLYMETL

ERJ 9-4 Gray



TEXACO CURVE OIL

being applied to curve at Ninth Avenue shop of

Brooklyn - Manhattan Transit System,

Brooklyn, New York

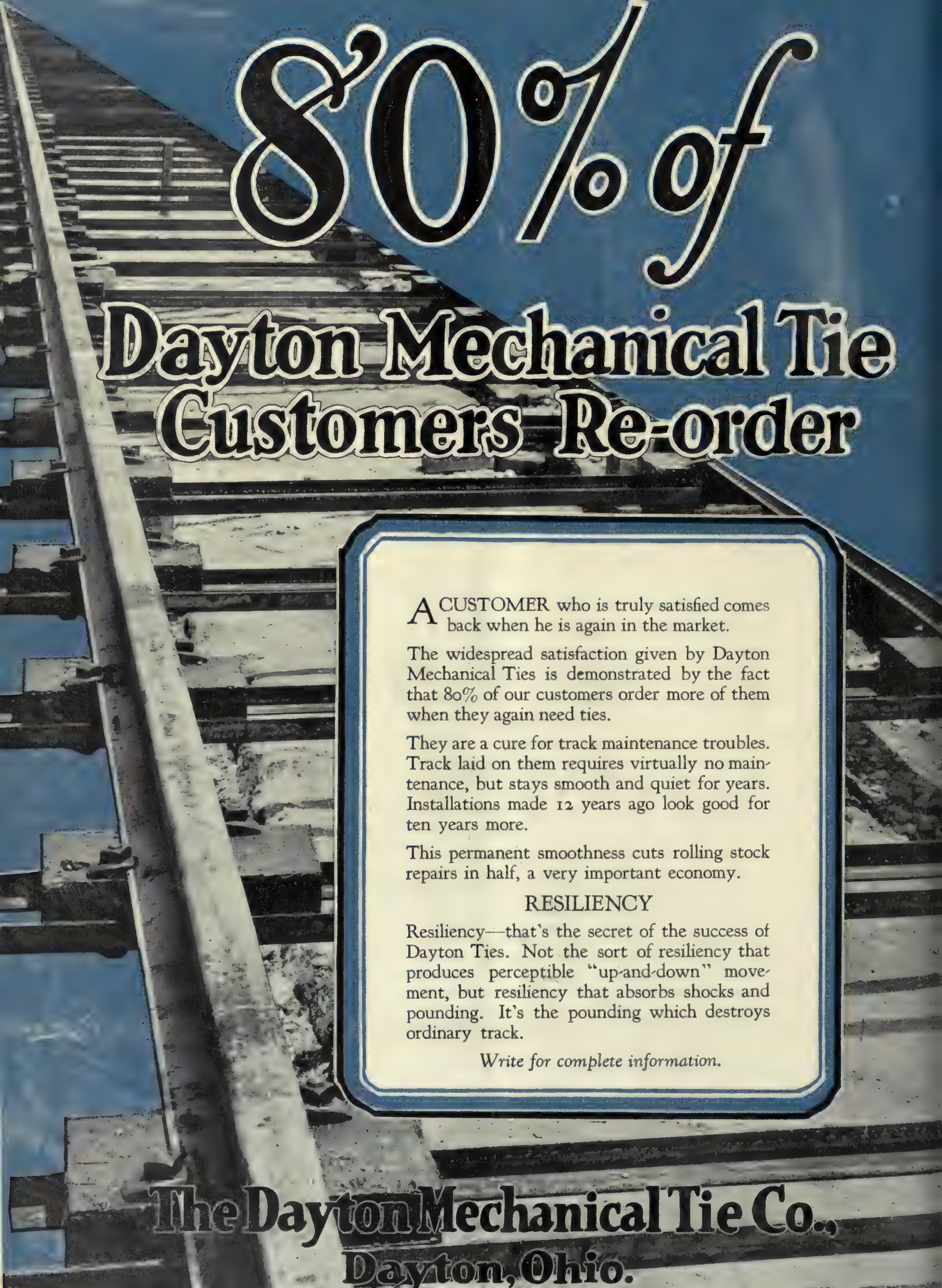
TEXACO

The Chosen Lubricant of ELECTRIC RAILWAYS

The Texas Company, U. S. A., 17 Battery Place, New York City

OFFICES IN PRINCIPAL CITIES

80% Of Dayton Tie Customers Re-Order Because Dayton Ties Prove More Than Satisfactory



80% of Dayton Mechanical Tie Customers Re-order

A CUSTOMER who is truly satisfied comes back when he is again in the market.

The widespread satisfaction given by Dayton Mechanical Ties is demonstrated by the fact that 80% of our customers order more of them when they again need ties.

They are a cure for track maintenance troubles. Track laid on them requires virtually no maintenance, but stays smooth and quiet for years. Installations made 12 years ago look good for ten years more.

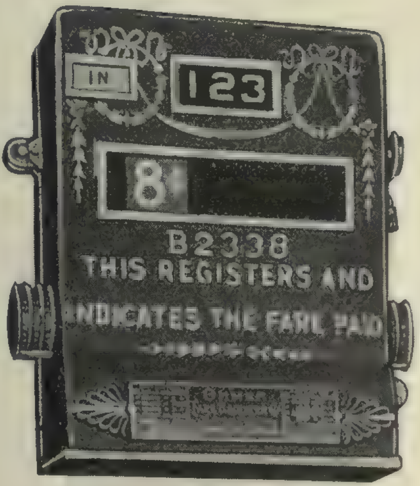
This permanent smoothness cuts rolling stock repairs in half, a very important economy.

RESILIENCY

Resiliency—that's the secret of the success of Dayton Ties. Not the sort of resiliency that produces perceptible "up-and-down" movement, but resiliency that absorbs shocks and pounding. It's the pounding which destroys ordinary track.

Write for complete information.

The Dayton Mechanical Tie Co.,
Dayton, Ohio.



What OHMER

REG. U.S. PAT. OFFICE

FARE REGISTERS

will keep a check on for You

ALL types of Ohmer Fare Registers indicate and record the exact amount and class of each fare paid.

The visible indication throws protective publicity about each transaction and the printed report gives such detailed and complete information as to each fare collected that a complete check is kept on operators, on passengers and on each business transaction which takes place between them.

Ohmer Fare Registers offer the most complete and most businesslike method of auditing the income.

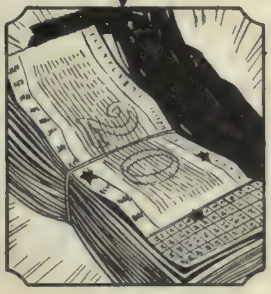
We manufacture Fare Registers, Ticket Printing Machines, Fare Boxes, Ohmer Taximeters, Atco Taximeters, Recordografs, Odometers, Hubodometers, Truck Auditors, and Commercial Counters.

Ohmer Fare Register Company

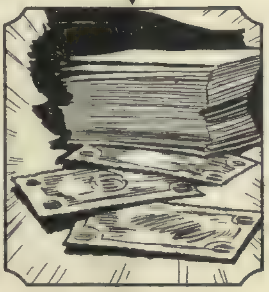
Dayton, Ohio, U. S. A.

OPERATORS

TRANSFERS

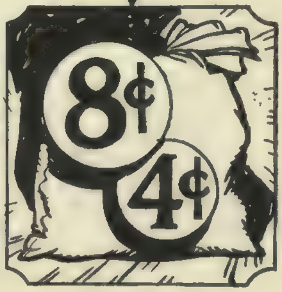


TICKETS



PASSENGERS

CASH



Convention Exhibits

Cleveland, Ohio

October 4 to 8, 1926

Present indications are that this year's Convention, which will be held in Cleveland from October 4 to October 8 will be one of the greatest, if not the greatest, in the history of the American Electric Railway Association.

More exhibit space has been sold than in any previous Convention.

Arrangements have been made for larger and more diversified exhibits than at any previous Convention.

All indications point to the greatest gathering of transportation men and the greatest car and equipment exhibit in history.

Interest in new design and new developments has never been keener. Railway men have learned that modern equipment pays. They are alive to the possibilities and to the need of replacing existing obsolete equipment, and are seeking information on parts and equipment that will make possible more modern operation.

Every manufacturer has the four opportunities outlined here to turn this interest into sales.

Convention Number

Electric Railway Journal

September 25, 1926

The Annual Convention Number of *Electric Railway Journal* has been the backbone of the successful Convention sales program since the beginning of Convention exhibits.

Reaching the entire industry one full week before the Convention opens, it annually paves the way for the Convention itself by a comprehensive discussion of the most important subjects before the industry.

This year's issue will be devoted to an authoritative analysis and array of actual experience on the most important question now confronting the industry. Do modern cars and modern methods really pay?

The far-reaching influence of the editorial pages has made the advertising pages of the Convention Number the most valuable part of Convention selling. Before—during—and after the Convention its pages are used as the authentic guide to the industry's important operators and manufacturers.

The manufacturer who uses it adequately and intelligently has assured for his products maximum attention throughout the industry as well as at the Convention.

There will be a thousand extra circulation at the Convention.

The closing date is September 15, 1926.

Convention Dailies

Electric Railway Journal

(3 Issues)

October 5, 6, 7, 1926

The full benefit of Convention attendance comes with knowledge of daily happenings.

The three Convention Dailies are edited on the "spot" at Cleveland and will appear on Tuesday, Wednesday and Thursday at the Convention. These three "Dailies" give the delegates the only news of the daily Convention happenings and activities. The issues summarize as well, the events of the preceding day and present the program for the current day.

The intimate manner of treating personalities has made "The Daily" a popular and expected feature of the Convention.

Over 6,000 copies of the Daily are distributed during Convention week. All registered railway men will receive a copy at their hotel at breakfast. Additional copies will be distributed at the Auditorium and meeting rooms.

Use them to stimulate active and immediate interest in your exhibit.

Advertising copy and plates intended for insertion in the three issues of the Daily should be sent to our New York office not later than September 15, 1926.

Convention Report Number

Electric Railway Journal, October 9, 1926

The Convention Report *Number* of *Electric Railway Journal* is mailed 24 hours after the close of Convention.

Carrying the first Complete reports of the Convention, it brings to the returning delegates and to those who were unable to attend, a permanent record of the best thinking and the important developments of the Convention.

The Report Number preserves the worth-while happenings for reference and study. Because it is kept and referred to for months the advertising pages provide "a better than ordinary" opportunity for lasting sales messages.

Competition for the railway man's time is extremely keen. Stimulate and maintain his interest by taking adequate advantage of these four proved sales opportunities.

DIXON'S
SILICA-GRAPHITE
PAINT

Pioneer Of All Graphite Paints

Lowers paint costs per year of service by providing efficient protection for a surprising period of time.

It is a natural combination of silica and flake graphite for the pigment. The vehicle is pure boiled linseed oil. This pigment is inert, aids in preserving the original elasticity of the vehicle, increases the thickness of the paint film, and has long life.

Dixon's Paint will not peel, crack or flake off and is not affected by rust-producing agents, such as fumes, acids, dampness, etc.

Write for Booklet 91-B

Joseph Dixon Crucible Co.

Jersey City, N. J. Established 1827

Nearly ¾ of a Million Miles

and apparently good for a million

ONE of the first Nuttall Heat Treated Helical Gears ever installed is still running, and is apparently good for an indefinite life.

DO YOU get that sort of service from the gears you buy?

Nuttall BP Helical Gears are saving most of their cost on many properties, just due to minimizing vibration.

Write for Bulletins giving full details

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

HEAT TREATED—

TROLLEY POLES

PRIOR to the last cold drawing operation every "NATIONAL-SHELBY" Seamless Steel Trolley Pole is given a special heat treatment. This is a very important part of the manufacture of a trolley pole. By this treatment the structure of the metal is left in the finest condition after having passed through the cold drawing operation. Thus every pole is ready to meet the severe conditions of service.

The elastic limit of these poles averages from 60,000 to 70,000 pounds per square inch. They are made in two regular designs—A and B. Design A for ordinary service conditions and where a light pole is practical and design B intended for heavier service.

Both types of poles are fully described in our booklet—The "SHELBY" Seamless Cold Drawn Steel Trolley Pole. A copy sent upon request.

NATIONAL TUBE COMPANY

Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES IN THE LARGER CITIES

ELECTRICAL INSULATION

PERFECT MICANITE INSULATOR REG. U.S. PAT. OFF. and PERFECT EMPIRE INSULATOR REG. U.S. PAT. OFF.

Micanite Sheets for all purposes
Micanite Commutator Segments
Micanite Commutator Rings
Micanite Tubes and Washers
Linotape, Seamless or Sewn Bias
(*Yellow or Black Varnished Tapes*)
Empire Oiled Cloths and Papers
(*Yellow or Black*)
Compounds Etc. Varnishes

Write for Catalogs and helpful booklet on Commutator Insulation and Assembly

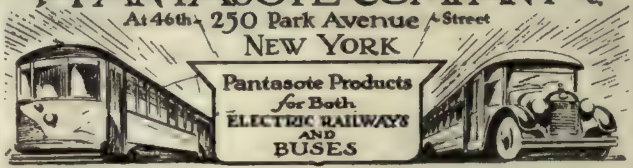
MICA INSULATOR COMPANY
New York: 68 Church St.
Chicago: 542 So. Dearborn St.
Works; Schenectady, N. Y.

PANTASOTE
Trade Mark
Seat and Curtain Materials
There is no substitute for Pantasote

AGASOTE
Trade Mark
Roofing—Headlining—Wainscoting
The only homogeneous panel board

standard
for electric railway cars
and motor buses

The PANTASOTE COMPANY Inc.



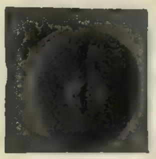
You're having brush trouble

CORRECT IT
USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers
C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.

R 11 Double Register

Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago

Used and Surplus Equipment

INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

This is the section which so effectively aided the Government in selling the many millions of dollars worth of surplus material and equipment accumulated during the war without disturbing the market.

"SEARCHLIGHT"

Durable Douglas Fir
AMERICA'S PERMANENT LUMBER SUPPLY

is railway wood...

A Douglas Fir transfer bridge for car floats of the Central Railroad of New Jersey.

DOUGLAS FIR is America's most useful softwood for every railway purpose. Every one of the A. R. E. A. structural grade combinations can be supplied in Douglas Fir—on short notice.

Light and Strong

The lightness of Douglas Fir makes handling easy—and when used for car construction, makes great savings in cost per ton mile of operation. The strength of Douglas Fir gives maximum load carrying capacity at low cost per board foot.

Stiff and Durable

The stiffness of Douglas Fir prevents excessive deflection under static or impact loading. The durability of Douglas Fir reduces maintenance charges. Other properties include resistance to mechanical wear, resistance to water penetration, nail-holding ability, excellent painting qualities, and unusual freedom from warping and checking.

Large Sizes Available

Special sizes of Douglas Fir, including timbers more than forty inches high by one hundred feet long, can be supplied readily on specified grade. No other commercial wood can be supplied in such large sizes. Douglas Fir will always be available from America's greatest forests. It has nation-wide distribution and can be obtained in every important lumber market.

Durable Douglas Fir
AMERICAS PERMANENT LUMBER SUPPLY

[Send a postcard or mail the coupon for a free copy of the new booklet, "Durable Douglas Fir—America's Permanent Lumber Supply." Every railroad executive should have this handbook of information.]

WEST COAST LUMBER BUREAU, H-71
5562-T STUART BUILDING, SEATTLE, U. S. A.

Gentlemen: Please send me a copy of your free booklet, "Durable Douglas Fir—America's Permanent Lumber Supply."

Name____________________

Street____________________

Place____________________

Important West Coast Woods
DOUGLAS FIR . WEST COAST HEMLOCK . WESTERN RED CEDAR . SITKA SPRUCE

"The Standard for Rubber Insulation"

INSULATED WIRES
and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company
The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta
Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.
Can. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor G. Mendoza Co., Havana.

AIMCO
REG. U. S. PAT. OFF.

Electric Railway
Automatic
Signals

for Accessibility
and Reliability

EST 1865 AIMco INC.1916
"American"
INSULATING
MACHINERY
COMPANY
REG. U.S. PAT. OFF.

Philadelphia, New York, Paris, England

Sales Agents:
Electric Service Supplies Co.
Philadelphia New York Chicago

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives in the Principal Cities

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

TULC
A
LUBRICANT

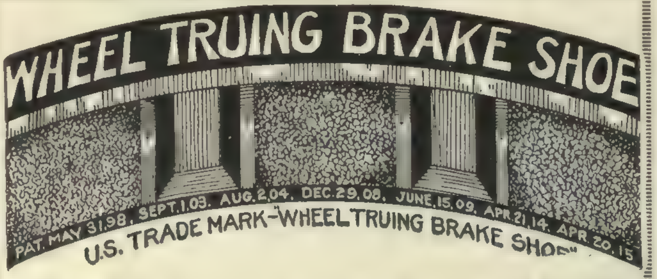
We make a specialty of
ELECTRIC RAILWAY
LUBRICATION
We solicit a test of TULC
on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company,
Straus Bldg.

Use only Awebco Tape on your Armatures

Field Coils have better protection when wound with "AWEBCO Tape." Send for samples.

ANCHOR WEBBING COMPANY
300 Brook Street, Pawtucket, Rhode Island


WHEEL TRUING BRAKE SHOE
PAT. MAY 31.98, SEPT.1.03, AUG.2.04, DEC.29.08, JUNE.15.09, APR.21.14, APR.20.15
U.S. TRADE MARK-"WHEEL TRUING BRAKE SHOE"

DON'T
REMOVE
WORN
WHEELS

This shoe does the work while your car is in service.

SAVES TIME—SAVES LABOR—
SAVES MONEY

WHEEL TRUING BRAKE SHOE CO.
Detroit, Mich.

AMERICAN ELECTRICAL WORKS
AMELECTRIC
Wires and Cables
PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE
AND CABLE
PAPER INSULATED
UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal: Chicago, 20-32 West Randolph Street:
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches	$4.50 an inch
4 to 7 inches	4.30 an inch
8 to 14 inches	4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E R J

POSITIONS WANTED

ACTIVE young man, single, age 22, over three and one half years special training with large builder of street railway cars and trucks, desires change to mechanical department of operating company with opportunities for advancing. Can arrange for an interview with any interested party at Cleveland convention and solicit correspondence of others not attending. PW-927, Electric Railway Journal, 1600 Arch Street, Philadelphia, Pa.

AUDITOR, now treasurer of bus company in East, experienced accountant, desires change, preferably to Middle West. PW-928, Electric Railway Journal, 1600 Arch Street, Philadelphia, Pa.

OPERATING executive, superintendent transportation, motive power and equipment. Broad experience and a successful record on city, one-man safety, interurban and bus properties. Labor, industrial, public relations, traffic problems. Co-ordination of railway and bus service. Desires to re-enter operating field. University graduate. A1 references. PW-921 Electric Railway Journal, 7 South Dearborn Street, Chicago, Ill.

SUPERINTENDENT of transportation: Qualified by a former successful record of twenty years on large city and inter-state properties also co-ordination of rail and bus service recognized as an official of exceptional ability, successful in rehabilitation of properties, public relations, accident prevention, one man operation and handling of labor. Fully competent to take over any property and get results. High-grade references, correspondence invited. Will make appointments for interview at Cleveland convention or at convenience of interested parties. PW-926, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

SUPERINTENDENT with twenty years' experience in operation and maintenance of railway rolling stock and track; an outstanding success as a railway operator and as operator of co-ordinated railway and bus services desires for personal reason to make change. Fully capable of taking complete charge as manager or superintendent. PW-925, Electric Railway Journal, 7 South Dearborn St., Chicago, Ill.

Wanted—

60 to 85 ton Electric Locomotive—railway voltage.

2—1000 kw. Railway Rotary Converters, 60 cy., 3 or 6 ph.

For Sale— Special Bargains

BIRNEY CARS

6—Standard Single Truck Double End

MOTORS

32—Westinghouse 306 SV Motors.

AIR COMPRESSORS

10—General Electric CP-27 Air Compressors.

8—Westinghouse DH-16 Air Compressors.

CONTROLLERS

12—K-35-G-2 Controllers.

IRVING S. VAN LOAN CORPORATION

1750 Broadway, New York City

SAVE 30% TO 50% ON

RAILS-LOCOMOTIVES-CARS

Economy—Service
Quality—Reliability

HYMAN-MICHAELS COMPANY

Peoples Gas Bldg., Chicago

ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

ROTARY CONVERTERS

2—Converter and Transformer units new in 1924.
Can be seen in operation at Warehouse Point, Conn.
Synchronous Converters
No. 4006698—4006699 G.E.
Type H.C.C. 6—500—1200.
Form P. Speed 1200 Direct Current.
Amperes 834 Nominal Volts 600 3 Phase, 1250 Amp. 2 hrs. 55 degrees C Rise.

TRANSFORMERS

Type H.J.T.H.
Form D.D. Volts 13200 Y 445 Cycle 60
Capacity 500 K.V.A. Nominal.
750 K.V.A 2 hrs. 60 Degrees C Rise.
Reactance 12% approx.
G.E. Regular Coil H. Design.
Immediate delivery can be made.

THE PERRY BUXTON DOANE CO.

Boston, Mass.

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built
West. 508 or G.E. 264 Motors
Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

ELECTRIC RAILWAY EQUIPMENT!

Railway Motors

25—Westinghouse 307's G.E. 80's.

Tower Truck

1—2½-3 ton White. Three section. Fully equipped. New 1923.

Car Hoist

1—Universal Columbia Mch. Co. make. Motor and control equipment included.

Welding Machine

1—Railway Welding and Bonding Co. New 1923. Fully equipped.

Birney Cars

4—32 seating capacity Westinghouse 508A motors. Fully equipped. Splendid condition.

Southern Cars

6—Double truck, 42 passenger. One man operation.

Sweeper

1—Double truck Snow Sweeper. Fully equipped.

Track Grinder

1—Atlas Rail Grinder new 1923. Excellent condition.

When the operations of the

NEW YORK & LONG ISLAND TRACTION COMPANY

ceased,—all equipment was purchased by us for resale. This unusual opportunity was then created for railway companies to secure at unbelievable savings the little-used equipment shown here.

All is in excellent condition—and the low prices will surprise you. Write for complete information and prices on what you can use.

H. E. SALZBERG CO., Inc.
50 Church St., New York City

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
Standard Steel Works
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.

Babbitt Metal
Johnson & Co., J. R.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
National Carbon Co.
Nichols-Lintern Co.

Bearings and Bearing Metals
Brill Co., The J. G.
General Electric Co.
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Elec. Service Supplies Co.
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Elec. Service Supplies Co.
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National Ry. Appliance Co.
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Brill Co., The J. G.
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General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
National Carbon Co.
Westinghouse E. & M. Co.

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National Carbon Co.

Brushes, Metal Graphite
National Carbon Co.

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Auto Body Co.
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Cummings Car & Coach Co.
Yellow Truck & Coach Mfg. Co.

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National Carbon Co.

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Differential Steel Car Co. Inc.

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Cement Accelerator
N. Amer. Cement Corp.

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Westinghouse E. & M. Co.

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Cincinnati Car Co.
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Westinghouse Elec. & M. Co.

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Westinghouse E. & M. Co.

Coils, Choke and Kicking
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Wm. Wharton, Jr. & Co.

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International Steel Tie Co.

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Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
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Jackson, Walter
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McClellan & Junkersfeld
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(Continued on page 56)

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Switches, Track (See Track Special Work)

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(Continued on page 59)

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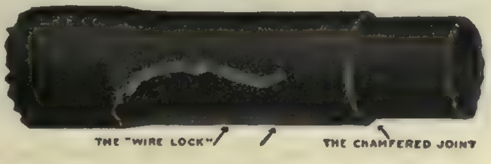

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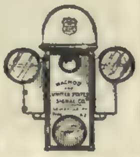

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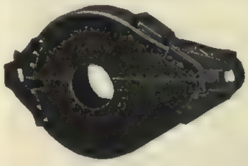

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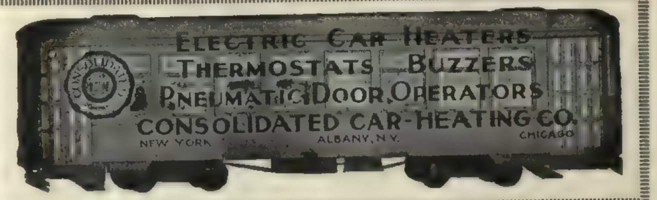

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1923

	Per Car Mile
Way and Structures	4.67c.
Equipment	2.88
Power	4.00
Conducting Transp.	11.69
Traffic	0.01
General and Misc.	8.10
Total	31.33

Operating Costs
NEW CARS
1925

	Per Car Mile
Way and Structures	4.59c.
Equipment	2.55
Power	3.44
Conducting Transp.	9.47
Traffic	0.15
General and Misc.	7.70
Total	27.60

Savings..........$76,140.00
* Approx. Investment $500,000.00
Return on Investment 15.2%

***The
Ohio Valley Railway
saves
15.2%
Return on Investment
with 40 New Cars**

New Cars—Where Efficiency Begins

Late in 1923 the Ohio Valley Railway Co. displaced a lot of old rolling stock, weighing as heavy as 58,000 lb., with 40 new modern cars weighing 37,700 lb. each. This new equipment has effected such substantial operating economies that profitable operation has been the result.

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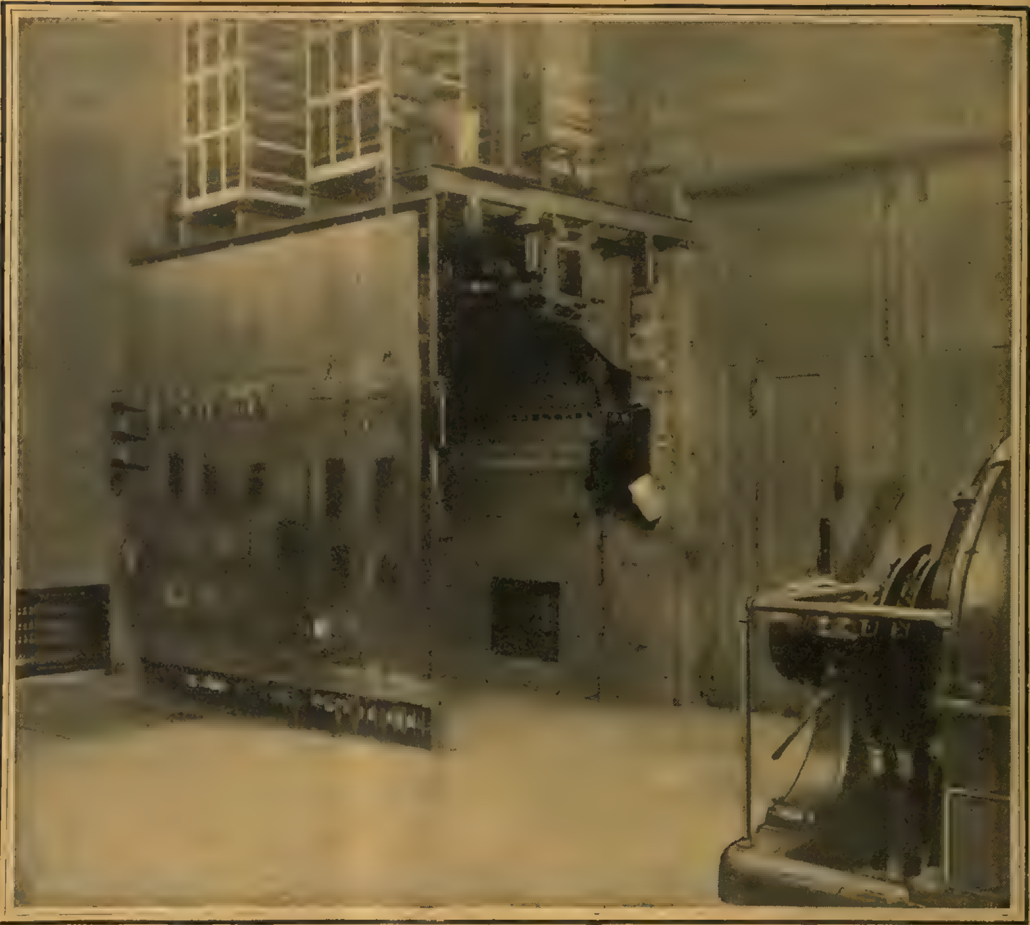

Lake Bluff Automatic Substation of the Chicago, North Shore & Milwaukee. In operation since February, 1919.

—built to endure

The unvarying good performance of the original automatic substations of the Chicago, North Shore & Milwaukee Railroad indicates that G-E Automatic Equipment is built to endure. The first was placed in operation in 1917 and its probable length of life is still for the future to determine.

The "North Shore's" growing list of automatic substations and its present program of installing automatic equipment in manual stations attest this company's confidence in G-E Automatics.

The G-E Automatic Equipments being built today are still further improved over those that are in regular operation after ten years of continuous service.

Three years before the Chicago, North Shore & Milwaukee adopted automatic control, the first automatic substation (G-E) was put into operation. This station is one of the several G-E Automatics that have been in service 10 years or more.

3-21

GENERAL ELECTRIC

McGraw-Hill Publishing Company, Inc. September 11, 1926 Twenty Cents per Copy

ELECTRIC RAILWAY JOURNAL

"We're sold on the idea of TRACK INSULATION,"

says V. R. POWELL

V. R. POWELL, *General Manager of The People's Railway Company, Dayton, Ohio. Mr. Powell has been following street railway construction and operation problems for the past 25 years, and is well known in the industry. He was not only the pioneer in the use of track insulation in Dayton, but was also the first to install thermit welded rail joints*

"AT the end of 1925 we had 3,368 feet of single track on the People's Railway lines in Dayton insulated with the CareyElastite System of Track Insulation," says V. R. Powell, General Manager of the Company. "That we are sold on the idea is best proved by the fact that our 1926 construction program calls for the use of 4,894 feet of double track insulation.

"We do not believe we will be bothered with the expansion of the brick, as we have in the past where grouting filler has been used. The Carey filler apparently makes a waterproof joint between paving and rail, and is flexible enough to take up any expansion due to pavement.

"Although this filler has not been in service long enough really to tell a whole lot about its advantages, from our experience to date we believe it is much superior to anything ever used in the past. We have inspected track in Cincinnati where Carey Elastite System of Track Insulation was installed seven years ago—and at the same time we inspected some track installed at the same time without the filler. The track in which the filler was used was still completely insulated so far as moisture was concerned, while the paving in the track laid without the filler was broken down in many instances on both the outside and inside of the rails because of imperfect insulation."

* * * * * *

Carey Elastite System of Track Insulation is an asphaltic compound substantially reinforced with asphalt-saturated felt. It is not affected by moisture or temperature changes, and will outlive the track itself. Can be fitted over splice-bars and bolt-heads simply by cutting it with a hatchet, and can easily be fitted to any shape or curve. A tap with a mallet sets the preformed strips in place.

Write, today, for complete information.

THE PHILIP CAREY COMPANY, *Lockland,* Cincinnati, O.

A view of new construction on the tracks of The People's Railway Company, showing the Carey System of Track Insulation completely installed.

Carey Elastite

TRADE MARK REGD. U.S. PATENT OFFICE

SYSTEM OF TRACK INSULATION

A Profitable Business Policy— "The Public be Pleased"

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Twenty-seven new cars, gaily decked with flags and flowers, paraded the streets of Grand Rapids to celebrate better service. Good publicity.

Fifteen bright new cars in a single train crossed the country from St. Louis to Richmond, Va.—a testimonial to confidence in the future of trolley transportation.

Cleveland conducted a traffic survey in down-town stores, to show that four-fifths of department store patronage rides the trolleys. . . . . These things to win public confidence.

There are hundreds of other instances of extraordinary service—extraordinary good-will. Many we read about; many others are never told in print. But the significant thing is the trend; the new spirit of service that inspires transportation men to provide newer, more comfortable cars and more convenient service; to attract public patronage and good-will. The spectacular—the unusual services—are merely evidences of the sense of responsibility that is winning for modern trolley management the confidence and support of the public.

Trolley transportation is a necessity; it is the backbone of our city life. As the trolley company profits, the community prospers. Their interests are inseparable. In scores—even hundreds of cities, modern trolley service is attracting a growing, profitable patronage through a definite policy—"The Public Be Pleased" In hundreds of cities, modern cars and better service are bringing more business to the traction companies—business that comes not alone of necessity, but by choice. In hundreds of cities, trolley transportation is earning a profit—not only for itself, but for the community as a whole. "He Profits Most Who Serves Best" is indeed fundamental.

Westinghouse has contributed much to Electric Railway progress. Westinghouse advertising to the general public has helped to break down barriers of prejudice and indifference. Westinghouse recearch has made possible practical development of the tools of transportation to their present high efficieny. Westinghouse service to the industry is a service for you. You will find it profitable to discuss your problems with the Westinghouse representative.

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ELECTRIC RAILWAY JOURNAL

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No. 11

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Valuable Cargo

IT IS SAID that "a single fact is worth a shipload of argument." On that basis the Annual Convention Number of ELECTRIC RAILWAY JOURNAL, to be published Sept. 25, will contain a highly valuable cargo. "Making Transportation Pay" is the subject. Theories and arguments are not used to tell how this should be done, but hard, cold facts presented by railway executives will show how it actually has been done.

On city and interurban railways, large and small, in the East, West, North and South—new cars and improved methods have paid and paid well. To every reader in the electric railway industry, the Annual Convention Number of ELECTRIC RAILWAY JOURNAL will carry new inspiration.

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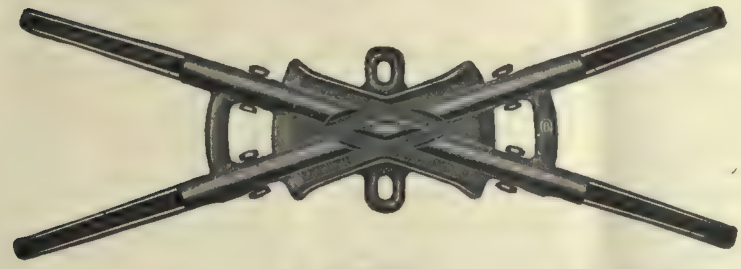

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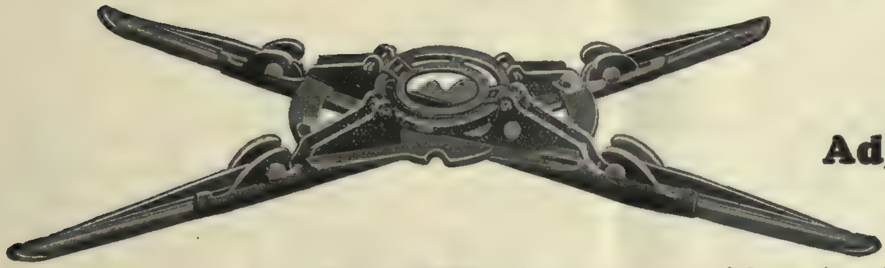

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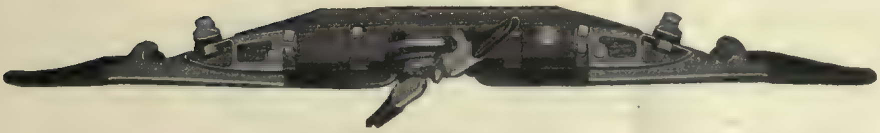

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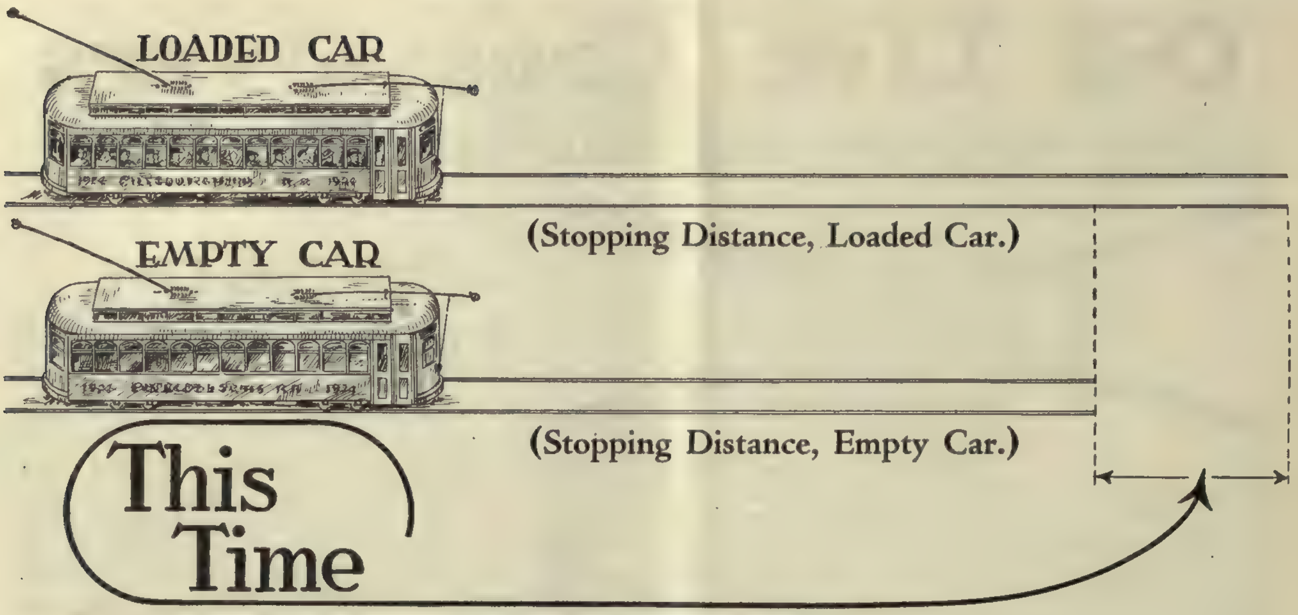
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WITH the ordinary form of air brake equipment the maximum retarding force is limited to that which is ample and permissible for an empty car, but which is inadequate to effect the proper degree of control on a loaded car—particularly if it has a high ratio of loaded to light weight—with the result that the stop is lengthened and more time is consumed.

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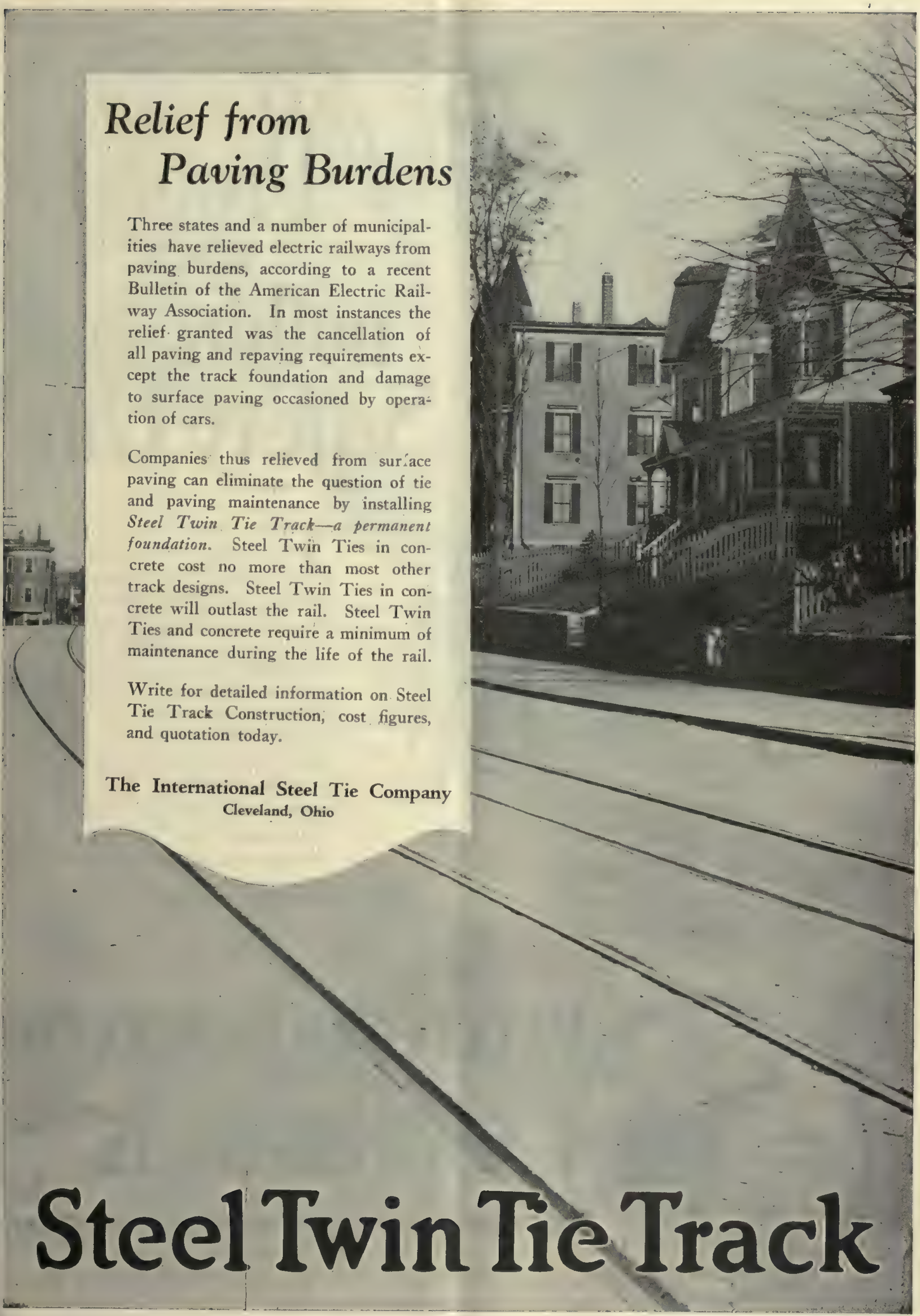

Relief from Paving Burdens

Three states and a number of municipalities have relieved electric railways from paving burdens, according to a recent Bulletin of the American Electric Railway Association. In most instances the relief granted was the cancellation of all paving and repaving requirements except the track foundation and damage to surface paving occasioned by operation of cars.

Companies thus relieved from surface paving can eliminate the question of tie and paving maintenance by installing *Steel Twin Tie Track—a permanent foundation.* Steel Twin Ties in concrete cost no more than most other track designs. Steel Twin Ties in concrete will outlast the rail. Steel Twin Ties and concrete require a minimum of maintenance during the life of the rail.

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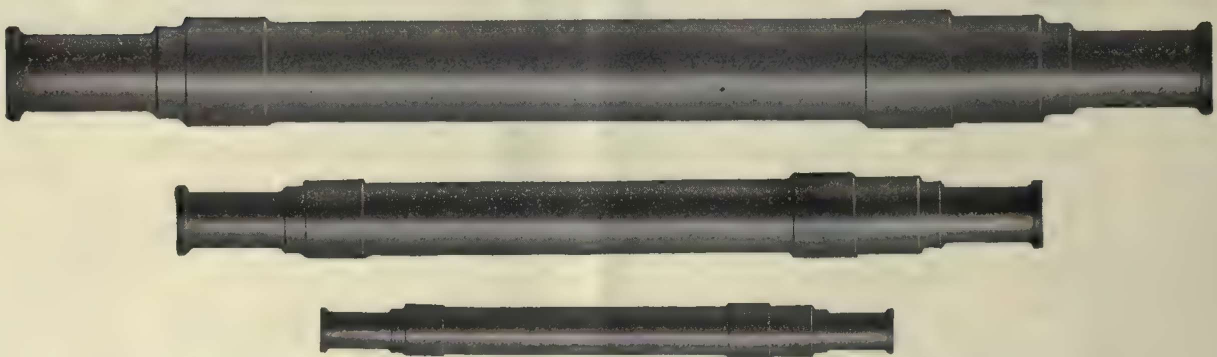
in Electric Railway Service



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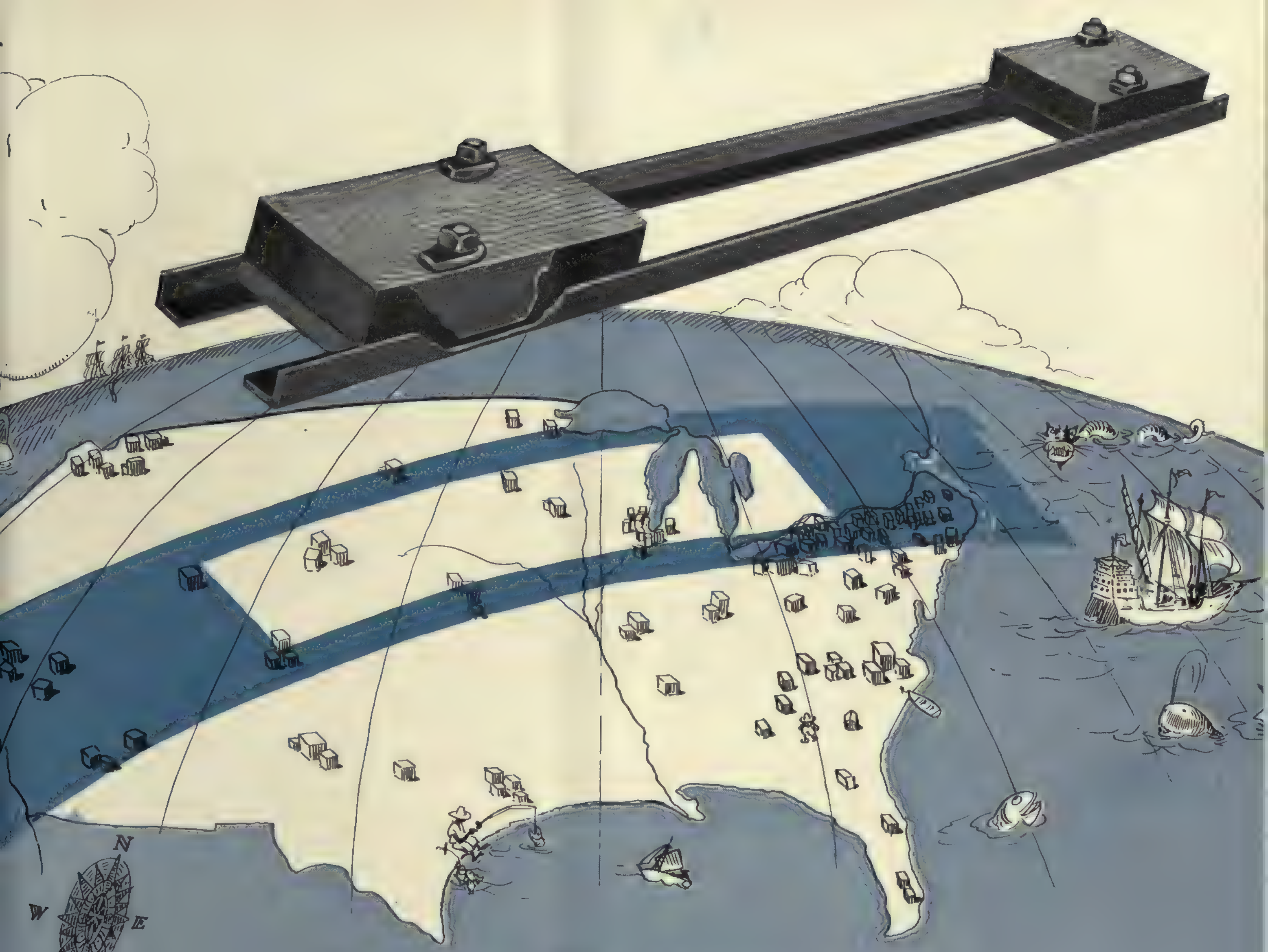
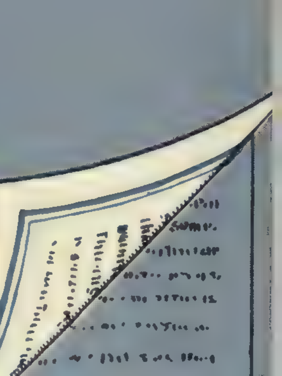
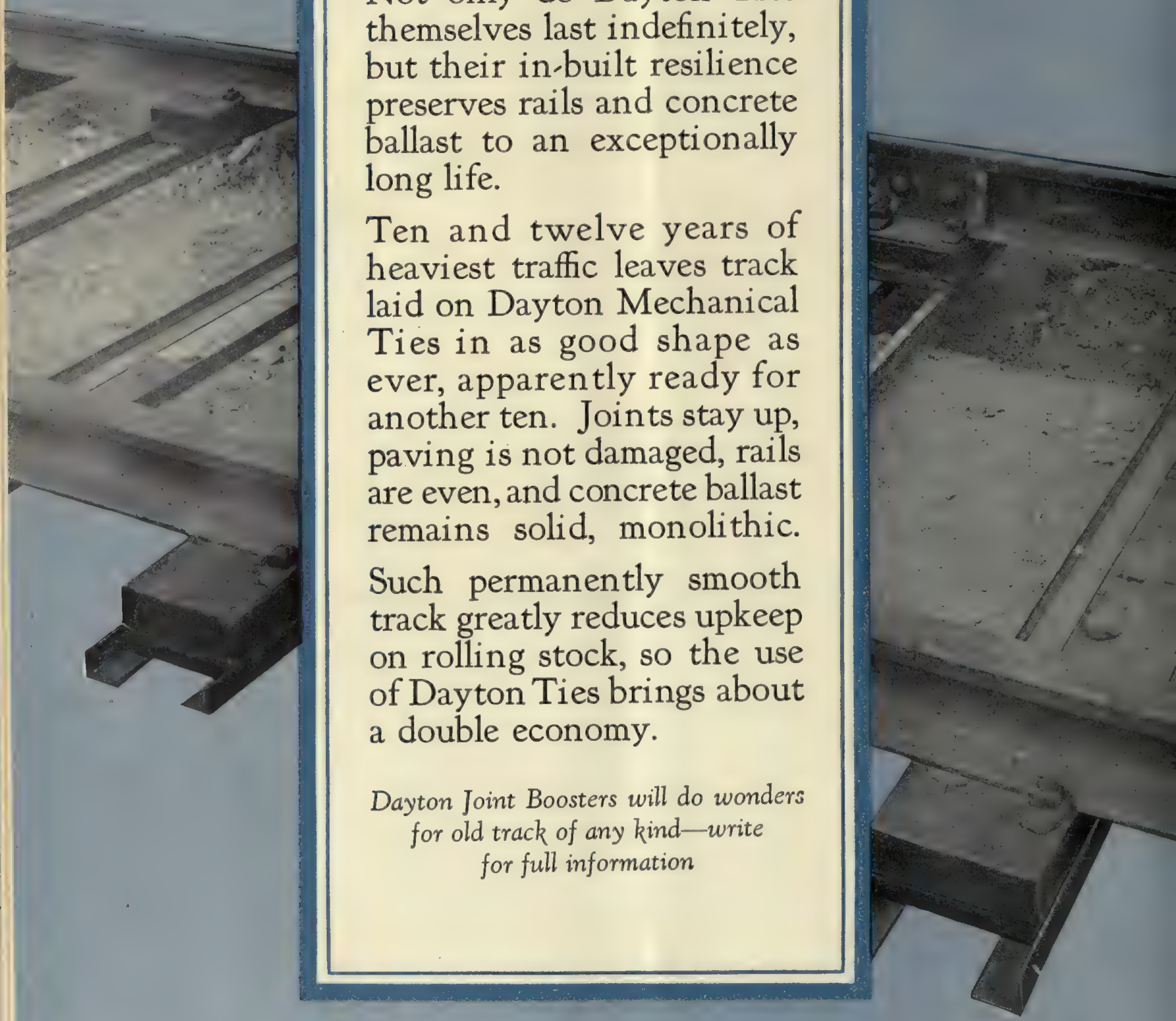


Street Railways In

127 Cities Now Use Dayton Mechanical Ties

The 127 cities having installations of Dayton Mechanical Ties are spread not only all over the United States, but into Canada and foreign





operators are recognizing Dayton phenomenal merit.

Not only do Dayton Ties themselves last indefinitely, but their in-built resilience preserves rails and concrete ballast to an exceptionally long life.

Ten and twelve years of heaviest traffic leaves track laid on Dayton Mechanical Ties in as good shape as ever, apparently ready for another ten. Joints stay up, paving is not damaged, rails are even, and concrete ballast remains solid, monolithic.

Such permanently smooth track greatly reduces upkeep on rolling stock, so the use of Dayton Ties brings about a double economy.

Dayton Joint Boosters will do wonders for old track of any kind—write for full information

The Dayton Mechanical Tie Co.,
Dayton, Ohio.

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Why public preference favors the "balanced" car
CO
732

ONE of the essential elements of Balanced Car Design, as interpreted by Cincinnati engineers, is a careful study of the requirements and preferences of the riding public.

If, for instance, the new car is for high-speed interurban service, it must not only be fast but *look fast*.

The trucks must insure easy riding at *high* speed.

Every detail of the interior must *balance* for utmost comfort on long trips. Trim and paint work to produce a restful color scheme. Deep cushioned seats and non-rattling windows to assure ease and relaxation during the ride. Ventilation and lighting to provide the utmost in travel comfort.

If on the other hand the car is for city service, there must be a still more careful *balance* of modern luxury with practical utility and economical maintenance.

Inviting appearance both inside and outside is essential. And to obtain this every element of design must *balance* in relation to the whole.

Cincinnati curved side construction for instance permits of wide aisles and seats, while at the same time providing greater clearance for passing vehicles. In addition, trim, floor covering, seats and the entire interior effect are *balanced* between attractiveness and utility.

This in short is the secret of the success of Cincinnati Balanced Lightweight New Cars—this and their proved ability to "stand up" under modern service conditions.

A twentieth century public has definitely shown its preference for such cars through the invariably satisfactory results which have attended their operation in all parts of the country.

Full details and operating data will be sent to interested executives on request.

THE CINCINNATI CAR COMPANY
Cincinnati, Ohio

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A step ahead of the modern trend

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Now industry has a new standard to guide it

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For the Graybar tag is the sign and symbol of the great Graybar Electric distributing organization. As such it is associated with a matured experience of 56 years (under the former title of Supply Dept., Western Electric); a vast array of 60,000 electrical items; and a strategically located group of distributing warehouses.

These, combined, make the Graybar tag a universal standard of satisfaction in all things electrical.

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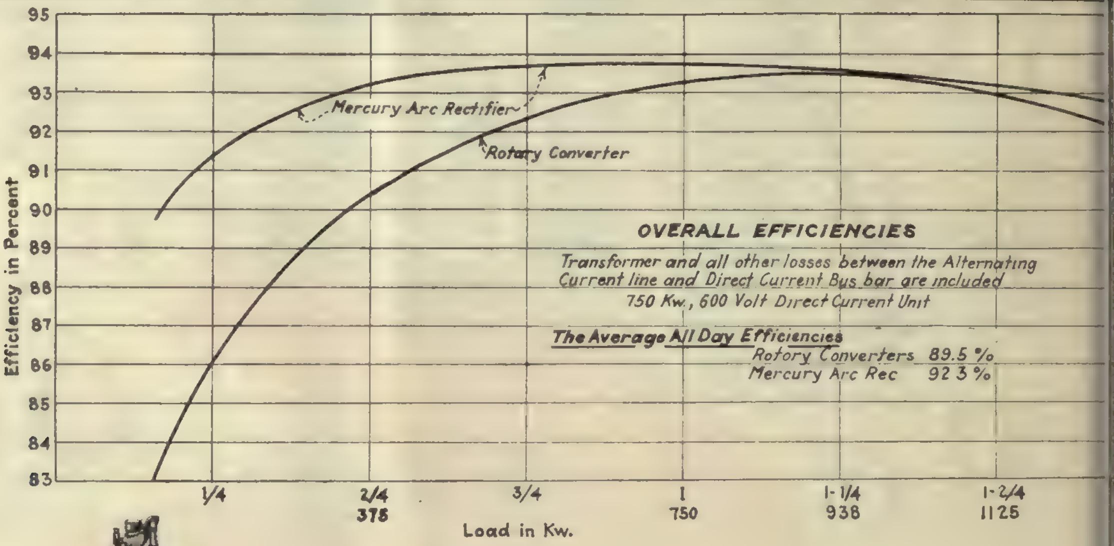

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750 Kw., 600 Volt Direct Current Unit

The Average All Day Efficiencies

Rotary Converters	89.5 %
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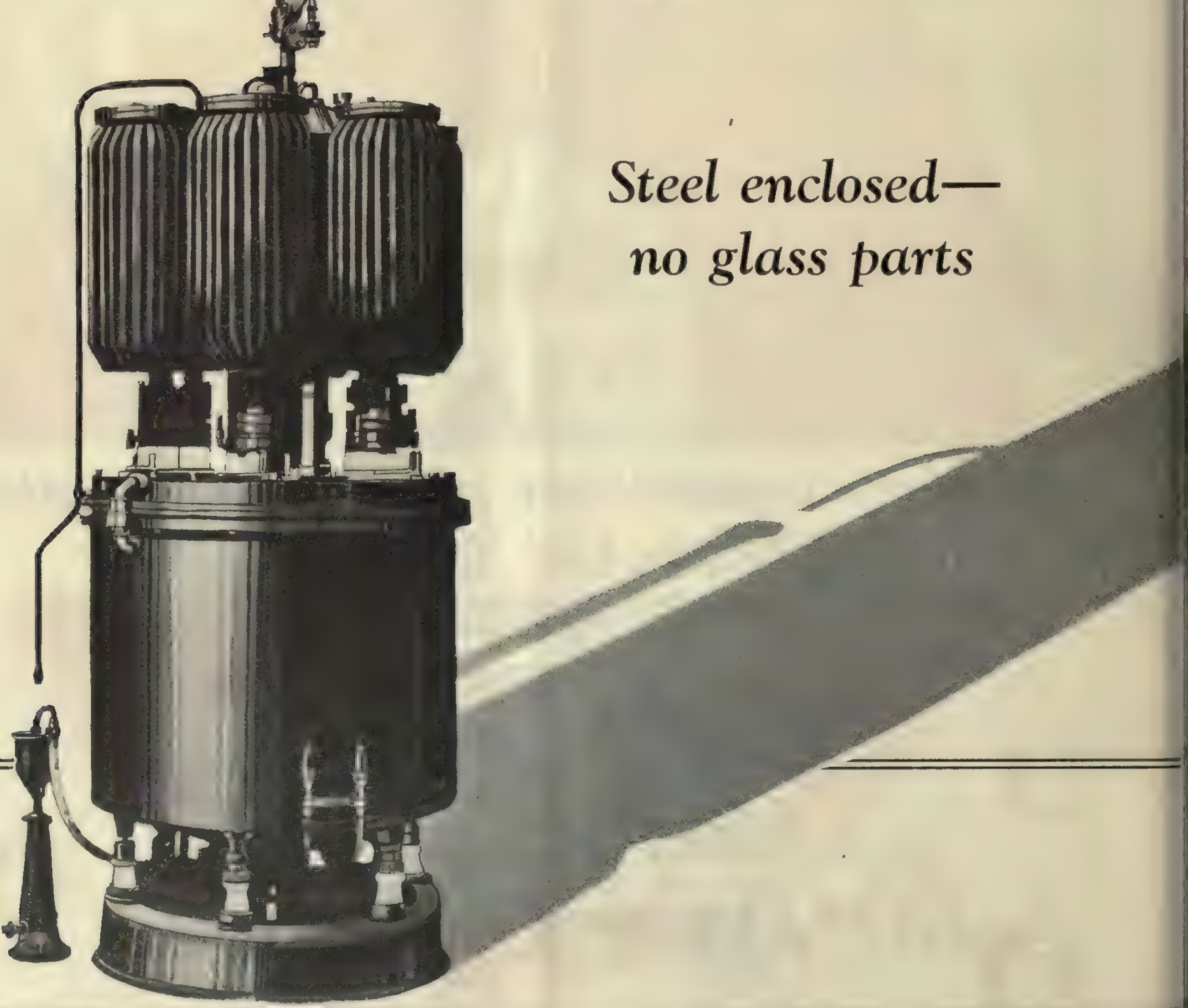

Steel enclosed—
no glass parts

Mercury-Arc Power Rectifiers

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3. No Synchronizing!

Here we find one of the most important attributes of the mercury-arc power rectifier, from the point of view of the railway company operating automatic substations. No complicated apparatus and no skilled attendants. Remote control of mercury-arc rectifiers in parallel, involves no problems. Acting essentially as one-way valves, for electric current rectification, without rotating parts, there is nothing to synchronize or put in step when starting up or throwing on the line.

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2. **Simple operation and minimum attention.**
3. **No synchronizing.**
4. **Very high momentary overload capacity and insensibility to short circuits.**
5. **Negligible maintenance.**
6. **Low weight. No special foundations.**
7. **Noiseless and vibrationless operation, consequently rectifier substations can be erected in densely populated localities.**
8. **New substations need only be of light construction. In many cases old houses can be converted, while the plant can often be erected in places that could not be considered for rotating machinery.**

Principal Products

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Electric Locomotives—for any system of current, high or low tensions

Complete equipment for railway electrification

Rotary Converters

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Switches, Controllers and all Auxiliary Equipment

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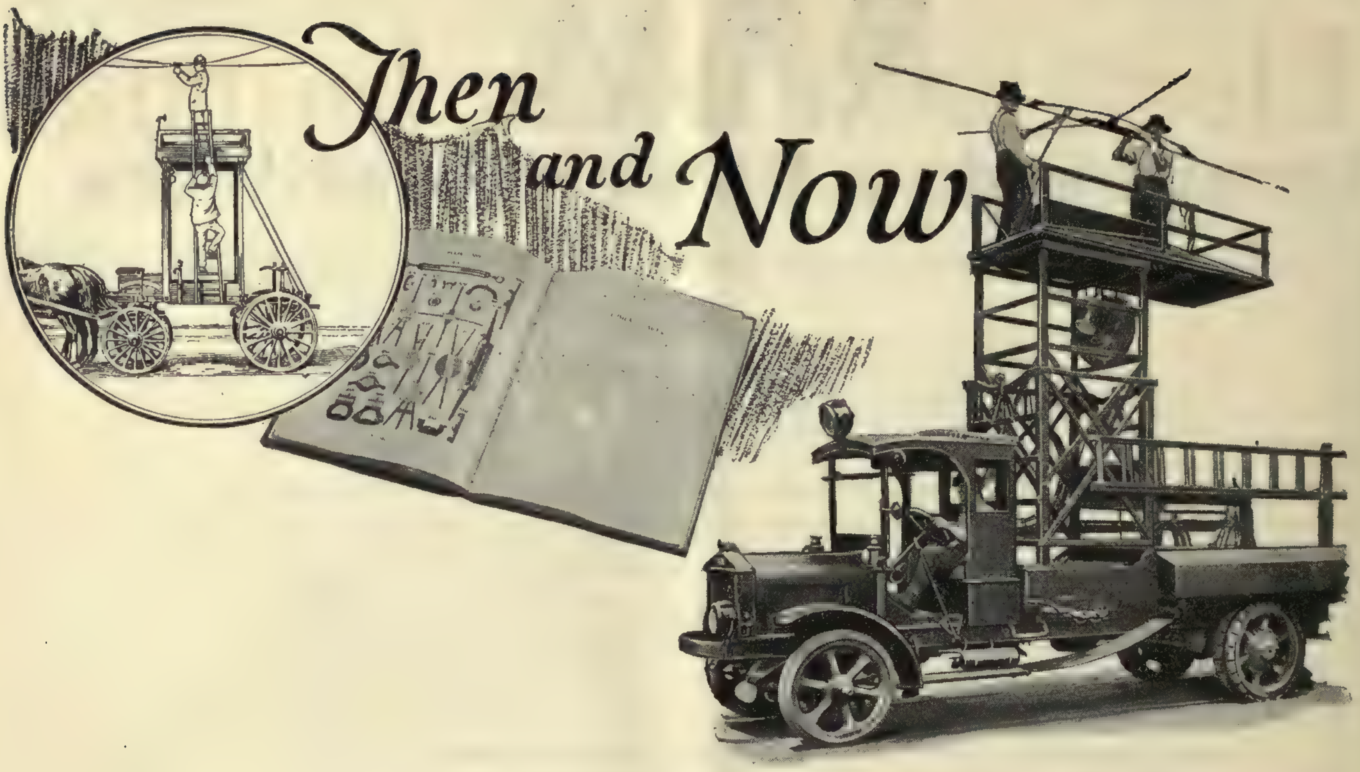


G-E Line Material the choice

Even when horses drew "high wagons" to the scene of new construction or emergency repairs, General Electric Line Materials were the well-known standard.

The 1896 edition of the G-E Catalog, shown above, suggests interesting comparisons with present-day G-E line devices, which have had the benefit of constant development, improvement, and proper additions during all these years.

Today, the seeker for "quality first" turns to his latest G-E Railway Supply Catalog, where 150 pages are devoted to line material that is thoroughly modern.

In line with General Electric's constant endeavor to simplify and facilitate railway maintenance, G-E Line Material has been standardized in a manner that reduces the number of devices to a minimum. This reduces cost and simplifies stock keeping.

For Modern Equipment Standards

15-6

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 68 New York, Saturday, September 11, 1926 *Number* 11

Automatic Control—A Triumph of Engineering

MANY engineers hold that there is no sequence of events in a mechanism so complicated that it cannot be controlled electrically, and in general from some remote point or by automatic devices.

The world marveled at the first automatic control of multiple-unit trains, by which one motorman could at will cause all the motors on each car to accelerate in unison. Today, that control seems absurdly simple when compared with the devices by which one man at a central point can not only start and stop the machines in an unlimited number of substations, but can get reports of every action taking place at each of these points when the equipment is operating automatically to take care of any set of conditions that may occur due to the load imposed on the stations—all without the intervention of human hands. The development of the mechanism by which these things are accomplished is one of the marvels of this engineering age.

The series of articles by L. D. Bale, superintendent of power the Cleveland Railway, shows how the engineers have conquered this most complicated problem so that, while the actions of the parts are extremely intricate, the one human being in charge need not bother with the detail but can concentrate his attention on the result sought. By so doing the reliability of the system has been increased manyfold. Furthermore, this has been accomplished with a gain in efficiency of the system. Such a result is worthy the serious attention of all electric railway men, whether or not they understand all the details through which the accomplishment was made possible.

A Street Car Exhibit and Its Significance

SIGNS all point toward a stimulated interest in car design development at the Cleveland convention. Space reservations by manufacturers and operating companies indicate that there will be brought together an exhibition of cars such as has never before been seen by the industry.

Manufacturers and operators have both been busy during the past year. There will be more cars shown than at any previous convention. But it is not in numbers alone that this exhibit will excel. The electric car is again making progress. There will be a feast of new ideas for railway men. Several interesting surprises are in store. At Cleveland there will be ample evidence that the industry is not headed for the scrap heap.

Out of this convention should come further interest in the replacement of obsolete cars. In Grand Rapids and more recently in Memphis there has been definite proof of the wholesome effect of such a program on the general public attitude toward electric railway service. This transcends in its importance the immediate effect on riding and operating costs. It has proved to be an effective means of winning public interest and cooperation.

Science and Engineering Needed in Car Development

NOISE measurement in electric railway car operation holds a multitude of possibilities. The equipment developed recently at the University of Wisconsin and the preliminary results obtained with it, as recounted in an article in this issue, show this. The reader undoubtedly will obtain the impression that much remains to be done both in development of the apparatus and in its use to determine and classify sources of noise. When this has been done, a new means of analysis will be available that should make radical improvements possible.

A moment's reflection on the application of science and engineering to car operation and construction leads one to the startling realization that such application has been conspicuous by its absence. Since the development of speed-time and energy curves, years ago, which led to a better understanding of railway motor performance, there has been little else than the practical application of practical methods. Of course improvements have been made in motor design. Substation equipment has been greatly developed, and to some extent new materials and new ideas have been adopted in electric car manufacture. But where has a searching analysis been made of the effect of different principles in car design, the effect of different types of cars on tracks and the counter effect of the tracks on cars, for the purpose of developing improvements?

Not long ago a railway operator admitted that he was vacillating between two policies in regard to car construction. At one time he believed that the high-grade interurbans must be operated by heavy cars that, due to their enormous weight, would damp out noise and vibrations. At other times he admitted that the economies of light-weight equipment and the easy riding qualities of this type of construction held a strong appeal. On this operator's property may be found new cars of both types. Upon what can this operator base his judgment? No one has determined by actual measurement whether or not a properly designed lightweight car could ride as easily as a heavy car. No one has determined how much less is the shock on both rolling stock and rails when cars of light weight are used.

The only criterion that exists with regard to noise is opinion. Opinion is valuable but not always convincing. In a court of justice it seldom is accepted, save as a last recourse, and then with many qualifications. Facts are the basic evidence that carry weight. And facts based on the application of science and engineering are badly needed to help in the development of the electric car to the position that it should and must hold.

Europeans Are Experimenting with Bevel Drive for Cars

GREAT interest should attach to the trials in Europe of bevel-gear drive for street railway cars. The general idea is not new, but the universal use of this kind of drive on automobiles has undoubtedly given an impetus to this form of construction. The construction of some 475 cars of this kind for Paris and others elsewhere in Europe shows that the application of this drive to street car propulsion has gone beyond the experimental stage. The differential form of axle construction, used with automobiles, has not been considered necessary in these cars. A solid axle is used for each pair of wheels.

The chief advantages claimed for bevel-gear drive for electric cars are: Reduction in total weight, amounting to from 15 to 20 per cent; a reduction in the unsprung weight of from 30 to 35 per cent; consequent reduced energy consumption and longer life of roadbed; better braking with reduced effort because the brakeshoes are applied to a drum on the motor shaft; reduction in height of car floor over the street level because of greater freedom in motor design.

It is somewhat notable that practically no change has been made in the position of the street car motor in this country during the last 40 years, or since Sprague first mounted it with journals on the axle. It may also seem strange that such a radical development should have been carried to the extent it has in Europe without more effort being made in this country to determine the possible advantages of this method of construction, in view of the far greater extent of the electric railway industry in this country than abroad.

The latter condition may be due, at least in part, to notable differences in manufacturing methods here and in Europe. These differences in some respects work to our advantage and in others to our disadvantage. They consist primarily in the practice here of manufacturing on a large scale with standardized parts as compared with the so-called "hand" manufacturing methods in Europe. Thus, for instance, an American achievement is the manufacture by machinery of millions of good watches which can be sold at a low price; Switzerland's achievement is the manufacture of a smaller number of hand-fitted, higher grade watches at a lower price than the similar grade of watch could be made in this country. The same principle applies in automobile manufacture here and abroad.

We do not know yet that the bevel drive for street cars is a permanent development. We do know, however, that if American electric railways are to utilize all of the possible improvements in their field, research work must be as active on this side of the Atlantic as on the other. It may be less easy here to change standard types of equipment, but at least we cannot afford to overlook the possibilities of radical improvements in design of electric railway equipment, such as the bevel drives for single-truck cars may be.

Consider the Value, Not the Source, of Suggestions!

TWO notable articles were published recently in ELECTRIC RAILWAY JOURNAL recording contributions made by women employees to the progress of utility organizations. They are not the first of their kind, but each of them carries a message to officials and personnel. The subject which Mrs. Mary C. Best discussed in the issue of Aug. 28 and that which Alice Schuetze took for her text in the issue of Sept. 4 are dissimilar, but each of them made her points well. Mrs. Best's "What One Car Said to Another" offers much food for thought. It is true that the idea in the analogy which she used is not new, but the clarity with which she made her points in contrasting the old with the new commends her comments highly. Her remarks, it would seem, should afford valuable publicity material, particularly to the operators of one-man cars. Miss Schuetze's contribution was of another kind. It recalls that the hand which rocks the cradle still rules the world, and the author shows some of the few ways in which it is done. The point she makes is a good one, that even the women who leave the utility industry for marriage continue to carry with them a message from the utilities to their neighbors, their club members and their families. These, of course, are some of the utilitarian values behind what these women have said, but their remarks have value entirely aside from this—value that shows the amount of real imagination and thinking many of the carefully selected female employees are putting into their work. This is something that it is feared not all men, even in this day and generation, appraise at its full worth.

Giving Away Other People's Money

PLATFORM men in the employ of the Cincinnati Street Railway have been insisting that they have their pound of flesh. And they have got it. They have got it through an arbitration award which will cost the company an additional $300,000 a year. Under conciliation they could have had an award of an increase of 1 cent an hour, but this they rejected.

In insisting upon getting their pound of flesh—and the expression is used to connote the worst—the men acted deliberately. It was to be expected that they would, but hope springs eternal in the human breast, when the mind is not obsessed with the idea of getting all one can, that labor may some time display a spirit of mercy. This is said not because of gullibility with respect to the motives that prompt labor, but because here was an unusual case.

It is one thing to say that the finding has been made, that it was in accordance with the evidence, and that the conditions it imposes should be borne and borne with grace. It is even granted that each side goes into a case of this kind fortified to uphold its contention, and that it is to be presumed the side against which the award weighs has failed to sustain its contention. There are many more things that might be said in extenuation of the policy of accepting the finding and saying nothing about it. Despite all these things the thought persists that in this case the insistence of the men was ill-advised.

The circumstances in Cincinnati are peculiar. Less than a year ago the complicated arrangement was unscrambled under which the local lines there were operated. Under the former arrangement, with economic conditions prevailing from which there was apparently no escape, a fare basis was reached that was onerous to the users of the service. Finally came the agreement under which the leasing arrangement between the Cincinnati Street Railway and the Cincinnati Traction Company was terminated and a new start made. That is all a matter of public record. In the present arbitration, the employees chose to disregard these things or not to heed them, and the two arbitrators who fixed the award, if they took the matter into account, must have minimized the effect of their findings on the company's ability to rehabilitate itself.

From the purely selfish point of view all this may be justified, but the feeling persists that Mr. McKnight was right when he said that "giving away other people's money may bring a pleasant thrill with it, but this does not justify awards that are economically unsound and hazardous." That is how the company arbitrator looked at it. That is how ELECTRIC RAILWAY JOURNAL looks at it. There may be some additional economies in operation which the company can put into effect, but despite this, the conclusion appears to be inescapable that the company's arbitrator was correct. So far as the men are concerned, they still have a chance to show that all is not self with them by rendering a super-service that may make it possible for the company to absorb some of the cost that the award has imposed. Under the circumstances, it will be a delicate test to which they will be exposed.

Most Men Wake Up When Their Pocketbooks Are Touched

MOST people do not worry greatly about the troubles of others. Indeed, La Rochefoucauld has said: "In the adversity of our best friends we often find something which does not displease us."

It may be that this somewhat cynical observation explains in part the attitude of the public to the street railway companies in connection with fare questions, now happily largely in the past, as well as the more modern problem of street congestion. The increases in fares of a few years ago were admitted to be necessary to public and carrier by those who had given serious consideration to the subject, but despite this public interest they did not come in most cases as the result of popular demand. It was only when an impartial commission granted them as a matter of justice or when the public came to realize that without an increase in fare the cars would stop and the community would no longer have an essential means of transport that higher fares were established.

Much the same explanation can now be given of the public apathy in connection with the parking evil in busy streets. Railway companies and others who have given study to the subject realize that with the amount of traffic greatly increased the effective width of the street is being cut down by a quarter to a half because automobile and truck owners use the streets for storage purposes. Still the public continue in their easy-going methods, thinking that after all it is some one else's worry, and that they personally are not affected.

The only way to wake these people up is to explain to them their really vital interest in the matter. This plan is now being followed in New York City, where a recent traffic investigation has shown that the cost per inhabitant for avoidable street congestion is at least $33 a year.

This figure is based on a report of the Fifth Avenue Association issued some time ago. When put in concrete form it becomes a very strong argument with the average citizen for some reform. Window announcements on the New York Railways cars therefore bear the words, "Traffic Delays Cost You $33 a Year," while the inside of the poster explains to the car rider how this figure is obtained.

The campaign for clearer streets is bound to be a long one, but it must be successful in the long run, as better conditions will benefit all.

Chicago's House-to-House Passenger Canvass

MORE attention than it apparently has received so far among electric railways is deserved by the house-to-house campaign conducted by the Chicago Rapid Transit Company. Counts have been made before among passengers of electric railways and canvassers have solicited from door to door in more than one instance, but the Chicago undertaking stands out as probably the most pretentious of its kind.

Figures of the canvass reproduced elsewhere in this issue are very interesting. Only 7 per cent of those interviewed were unfavorably disposed toward the company and about 1 per cent hostile. The reason for this hostility was deduced by the survey to show that the biggest factor was the personal service of the individual employee. That was mighty interesting. The company accordingly set about the work of spurring its men on to greater and greater effort, and the campaign was not only accepted with grace by the men but provoked enthusiasm to do even better than before.

More than a year ago the company staged its passenger partnership campaign, in the course of which about $5,000,000 of stock was sold locally, mostly among the company's riders. That did much to cement the community of interest between the company and its patrons, fostered before that in many ways, particularly by advertising the facilities of the company and the service, to say nothing of the modernization of the system physically with respect to new cars, improved station facilities and other changes.

Of course, the disposition of the so-called intelligentsia among car riders everywhere to sneer at all such movements will probably persist despite the tangible evidences already discernible of the efforts being made still further to improve public relations, but the fact remains that the contacts previously made between the company and its patrons and those fostered by the more recent canvass have been strengthened.

As indicated before, there has been plenty of evidence on the part of the company of its willingness to improve the physical property. So the patrons apparently appreciate that they are benefiting no less than the security holders. The obligations of the two have, of course, always been mutual, but in the past the disposition too frequently has been for one or the other, and sometimes both, to lose sight of this. To sum up, the canvass recently made and the campaign conducted among its own men show that the Chicago company has been studying its market and studying it carefully with profit to its patrons. This means profit to itself, not all tangible, perhaps, but still profit—profit in its broadest sense.

Light-Weight Cars of This Type Are Widely Used by Société des Transports en Commun de la Région Parisienne

Paris Uses Bevel Gear Drive Extensively

Four Hundred and Seventy-five Cars of This Type Are in Use or on Order—More than Four-fifths of Entire Weight Is Spring-Borne—Tests Show These Cars to Be Economical in Operation

A DEVELOPMENT extending rather rapidly in Europe, though practically unused in America, is the Cardan drive for electric railway cars. Previous articles in the JOURNAL have told about different installations with this drive, particularly in France and Switzerland. This lends interest to an extended article in the May 26 issue of *L'Industries des Voies Ferrées et des Transports Automobiles* which sums up the progress to date along this direction, particularly in Paris. Here the modern application of bevel gears to electric street cars seems to have begun with an experimental car built in 1921. Others of somewhat different construction followed and now 475 motor cars of the type known as "L" have been in use in Paris for about three years and eight cars of the same type have been in operation in Nice for a year or more. All were built under the patents of the Scemia Company (Société de Construction et d'Entretien de Matériel Industriel et Agricole) of Paris.

The abbreviation "L" stands for "light" because these cars are lighter in weight than the former standard equipment. The latest type "L" car, as used in Paris, is a four-wheel, center-entrance car with the following main dimensions and details:

Wheelbase, 11 ft. 10 in.
Seating capacity, 49 passengers.
Complete weight empty, 28,380 lb.
Weight per seated passenger, 580 lb.
Weight of body (with motors and equipment) 20,900 lb.
Unsprung weight, 4,180 lb.
Deflection of spring support, 0.18 in. per 1,000 lb.

The car has a chassis on which the body is supported, as shown in the accompanying illustrations.

The chassis is made up entirely of rolled shapes to secure lightness, the longitudinal members being one piece connected by cross girders and large gusset plates. All of its weight, however, is spring-supported on the axles through a system of horizontal and vertical springs, both semi-elliptic and helical.

The vertical spring support is obtained, as shown in an accompanying illustration, by semi-elliptic springs attached at their center to the journal box, while their ends support the car body and equipment through vertical helical springs. These latter take up small shocks from the track which cannot be absorbed by the large leaf springs. The total flexibility in a vertical direction of these springs, as stated, is about 0.18 in. per 1,000 lb., or about double that of an ordinary motor car on standard trucks.

COMPARATIVE PERFORMANCE RECORDS WITH TYPE "L" CAR AND STANDARD CAR ON TRUCK

	"L" Type Motor Car			Motor Car on Truck Standard Type			Economy Gained by Type "L" Car	
		Energy Consumption			Energy Consumption			
Condition of motor cars	Weight Metric Tons	Total Kw.-Hr.	Per Ton-Km. Watts	Weight Metric Tons	Total Kw.-Hr.	Per Ton-Km. Watts	Total Energy Consumption Per Cent.	Per Ton-Km. Per Cent.
Motor car empty	13,180	9,520	63.5	15,500	11,300	64.0	15.7	0.78
Motor car loaded	16,060	10,720	58.7	18,250	12,320	59.3	13.0	1.01
Motor car and trailer........	29,320	19,080	57.2	36,600	20,850	58.0	8.0	1.38

Transverse shocks, which occur while the car is rounding curves or passing over bad joints in the track, are absorbed by the resistance provided by the spring links connecting to the ends of the leaf springs and the chassis, as shown in the illustration. This system of spring support is so flexible that a single man can make the body of the car oscillate. This system of support is the same as used on many automobiles and has been found to give comfortable riding.

The driving equipment for each of the two axles consists essentially of the following four parts:

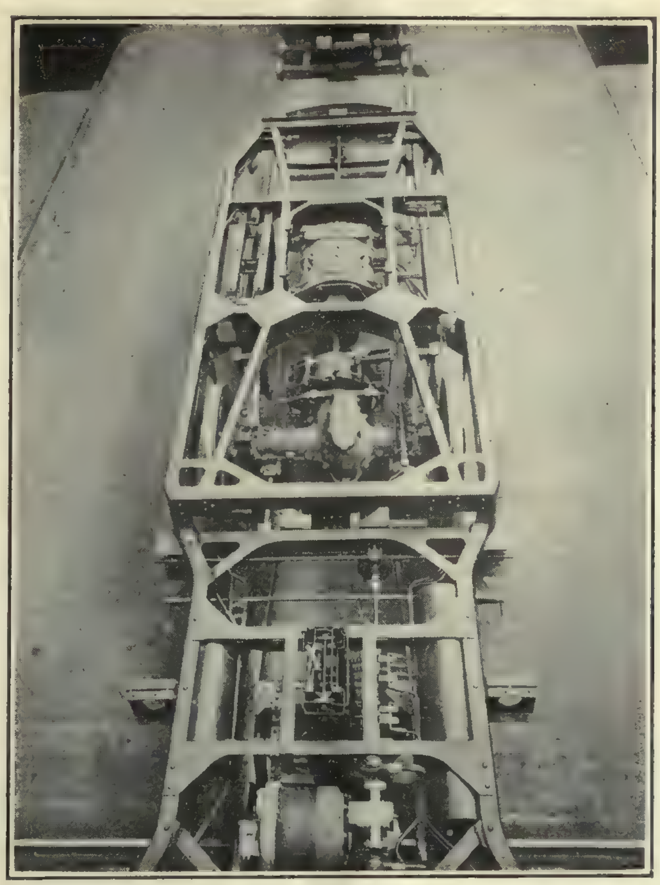
1. The driving equipment, consisting of the axle, the pedestal bearings and the bevel gear, these various parts being fully inclosed in a casing.
2. An electric motor, supported entirely on the chassis.
3. A driving shaft with universal coupling, connecting the motor to the driving mechanism and permitting free play of the motor about the axle.
4. Links transmitting the effort of propulsion from the driving equipment to the chassis.

DRIVING EQUIPMENT

The driving equipment is shown in an accompanying illustration and consists of (1) an axle carrying the bevel gear and the car wheels and (2) an oil-tight casing which surrounds the gearing and forms a support for the axle pedestals.

To insure the bevel gearing functioning correctly, it is necessary to have the axes of the bevel pinion and the bevel gear keep an invariable position, the one with respect to the other. This is accomplished in the following way:

The bevel pinion is carried on a shaft whose outer end passes through a thrust bearing in the casing, while the inner end is supported by a bearing in a swiveling collar mounted on the axle, and kept in position with respect to the gear by a shoulder on the axle. Though wear takes place the axes of pinion and gear remain in the same plane. Angular displacement of the pinion axis with respect to the gear is provided for in the thrust bearing. The bevel gear is made in two parts which are mounted on a hub of forged steel, pressed on the axle. Both oil and grease are used for lubrication. The bevel gear revolves in a bath of oil; the oil is distributed by grooves to adjacent bearings.



Underframe of Paris Light-Weight Car Showing Position of Motor and Cardan Drive

MOTOR

The motor is of the ventilated type with box frame. At 550 volts and 800 r.p.m. on a one hour's rating the output would be about 50 hp. The weight is 720 kg. (1,584 lb.) or 14½ kg. (31.7 lb.) per horsepower. As already explained, the motors are mounted directly on the chassis and are thus entirely spring-supported.

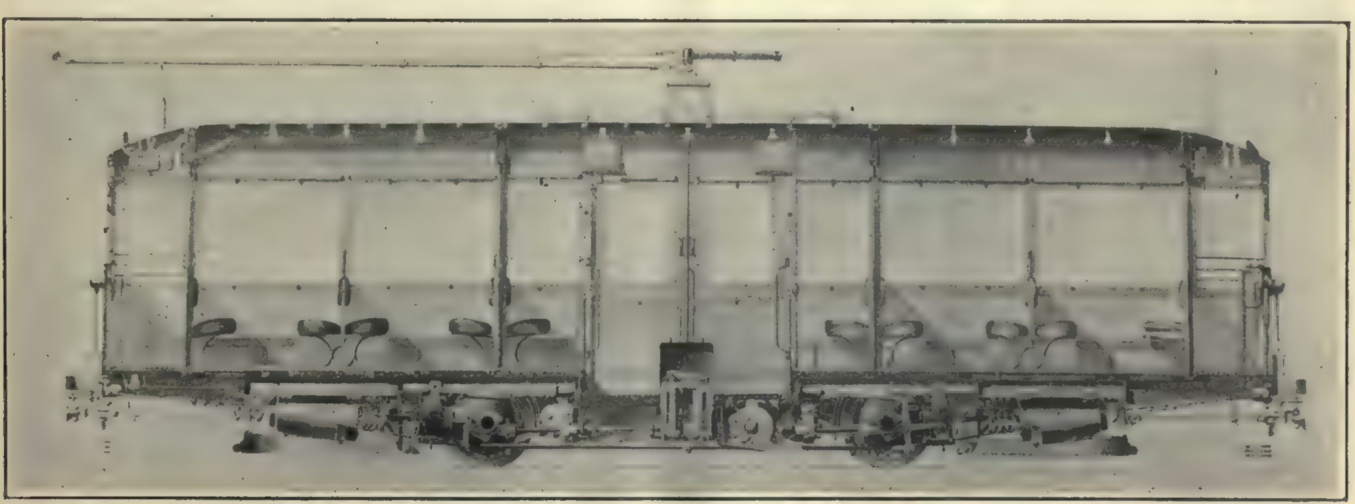
Ball bearings are used for the armature and these bearings are installed in the end housings, which are bolted to the frame of the motor. To remove an armature, only the rear housing has to be unbolted. The ventilating fan is mounted on the armature shaft on the end opposite to the commutator.

Since the motors are attached directly to the chassis they are subject to all of its transverse and vertical oscillations. Hence, to maintain the alignment between the motor and the gearing, it is necessary to have a flexible coupling which allows free play to the suspension so that the movement of the motor will have no effect on the alignment of the gearing. This is accomplished by equipping the transmission shaft at each end with a flexible coupling, made up with rubber gaskets.

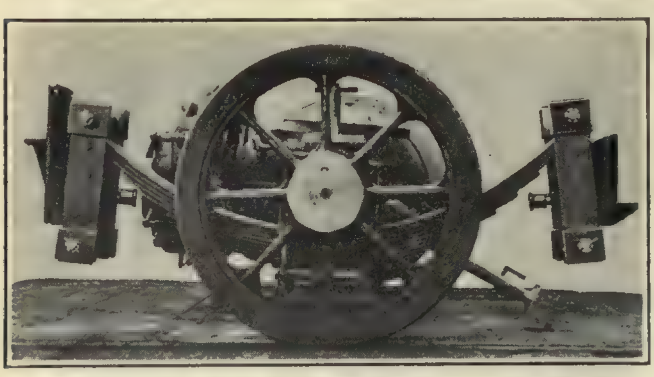
BRAKING EQUIPMENT

Braking is done not against the wheels but by brake shoes which are forced by levers against a drum keyed on the pinion shaft. There are, of course, two pinion shafts, so there are two sets of brakes, one on each shaft.

The brake levers are arranged vertically on each



A Well at the Center Reduces the Step Height While Leaving Space at the Ends for Motors and Driving Mechanism



By This Arrangement of Springs the Unsprung Weight Is Kept Down to a Minimum

side of the drum and are attached at their lower ends to the casing, permitting movement for the application of the brake shoes. In order to provide for the wear of the shoes, the latter are pivoted at one point on the brake lever so that their wear is even over the entire face, irrespective of the position of the brake lever. An adjustment provides for taking up the wear of the brake shoes.

This method of braking is about three times as effective as that of braking on the wheels, as can be shown by a simple calculation. The rate of speed of the motor shaft as compared with that of the car wheels is 69 to 11, but the diameter of the drum is about 425 mm., as compared with 815 mm. diameter of the wheels; (69 x425) ÷ (11x815) equals somewhat more than 3.

The brakes can be operated by hand or pneumatically from either end of the car.

The compressor motor is of the series type, revolving at 1,100 r.p.m. and of 2½ hp.

CONTROL AND COLLECTOR

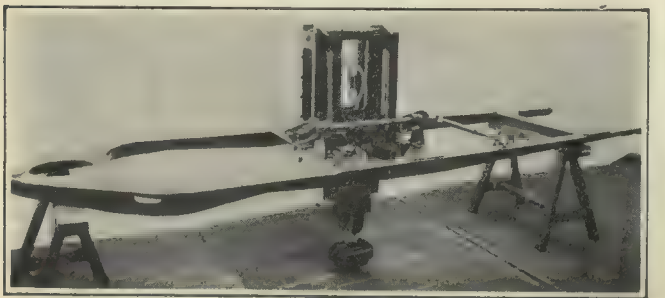
The control equipment contains no special features. It has nine operating positions and four rheostatic braking positions and has been especially designed to reduce its weight, which has been brought down to 104 kg. (229 lb.).

The current-collecting apparatus consists of a plow for operating in the conduit and also a trolley for use on the overhead system.

OPERATING RESULTS

The new method of drive shown has given good results from the standpoints of both light weight of equipment and reduced maintenance. The results of some comparative tests with this type of "L" car and of the latest previous type of car with a single truck under exactly the same conditions are given in the table on page 408.

Other tests showed that at the same speed the tractive effort per ton was about 5.4 per cent less for the type "L" car than for the car equipped with trucks.



Condult Plow Carried Midway between Wheels and Capable of Being Raised and Lowered by Rack and Pinion

The two cars were of exactly the same dimensions. The type "L" car used for the test had operated since being put in service 2,335 km. (1,460 miles) and consequently at the time of the test was in good operating condition. The other car, mounted in the usual way on a single truck, had run 2,000 km. (1,250 miles) after having received a general overhaul. It was equipped with two motors and presented the following general characteristics:

Capacity of each motor, 55 hp.
Potential, 550 volts.
Current rating, 88 amp.
Motor speed, 450 r.p.m.
Gear reduction, 71: 17.

Tests were carried on with these two motor cars operating singly and then each hauling a trailer which was in good operating condition. The equipment was inspected in detail and was lubricated daily during the test. Tests were made with the cars empty and also loaded with 65 kg. (140 lb.) per seat.

The trial runs were made in the suburbs of Paris so as to get track free from street congestion and permitting regularity of operation. The profile varied from level to 4 per cent grade. The length of run was 11.375 km. (7.1 miles) and included 31 stops. The run was made in 34 minutes and the schedule speed was 15.5 km. (9.7 miles) per hour.

MAINTENANCE

It is believed that there will be a considerable reduction in maintenance owing to the lighter equipment. A striking feature of these new motor cars is the ease with which they pass around curves of short radius on account of the radial action taken by the axles in respect to the car body. The result is a much decreased wear of track and tires, notably the latter, and an increase has been noted between re-turning of tires of from 20 to 30 per cent in car-miles for the motor cars with these axles as compared with those with rigid axles.

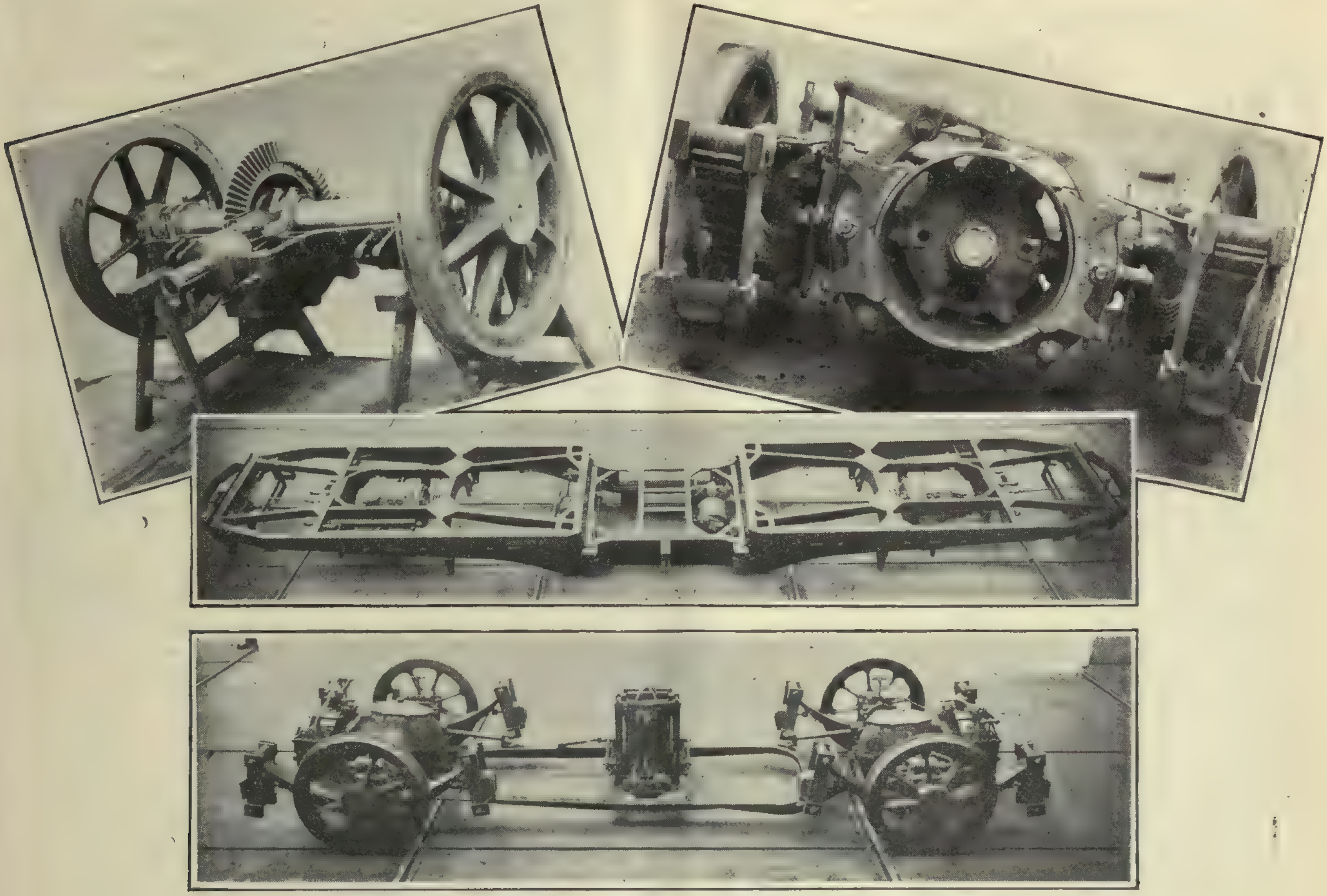
REDUCED LUBRICATION COSTS

With this type of motor with Cardan drive, the number of places requiring lubrication is much less, so the amount of lubricant required is less, as well as the time required in applying it. A number of inspections show that the gain in time required in lubricating amounts to 50 per cent and in quantity of lubricant used to 18 per cent.

BRAKESHOE EQUIPMENT

The decrease in weight of the braking parts is not the only advantage which follows the method of braking on a drum. There is a gain also in the life of the brakeshoes. The ordinary type of brakeshoe applied on wheels is subject to rapid wear on account of the high pressure of the shoe against the wheel (in the order of 15 kg. per square centimeter), by the condition of the surface of the tire, which is apt to be rough in winter, when sand is often employed, and the effect of the sand on producing wear when it is between the tire and the shoe. Thus, one company with a large traffic reports that the average life of its brakeshoes is only from one month to five weeks.

With the type of brake used on these cars, on account of the higher speed of the motor, the pressure of the shoe on the drum can be greatly reduced, namely, to



Parts of the Equipment of Car with Bevel-Gear Drive in Paris

At top, left—Bevel gear and pinion with upper half of casing removed.

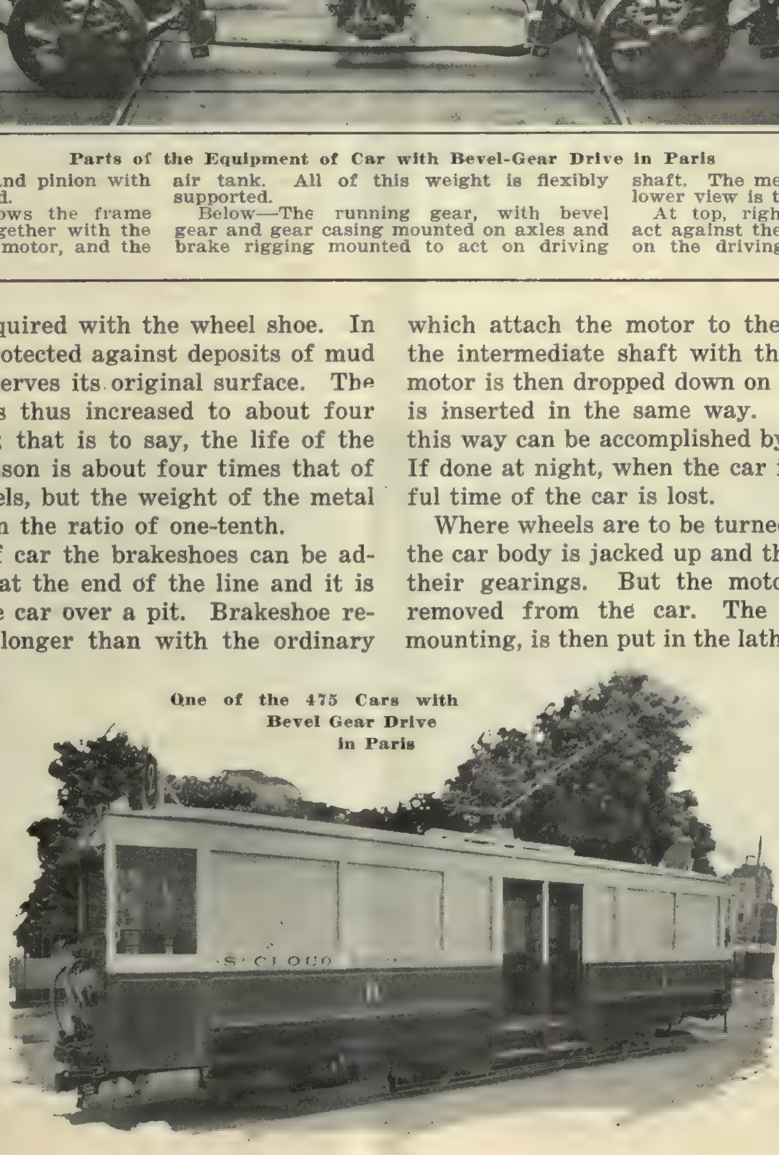
In center—This view shows the frame which supports the floor, together with the car motors, the compressor motor, and the air tank. All of this weight is flexibly supported.

Below—The running gear, with bevel gear and gear casing mounted on axles and brake rigging mounted to act on driving shaft. The mechanism at the center in the lower view is the conduit plow.

At top, right—The brake shoes do not act against the wheels, but against a drum on the driving shaft.

about one-sixth that required with the wheel shoe. In addition, the drum is protected against deposits of mud and dust so that it preserves its original surface. The life of the brakeshoe is thus increased to about four months on the average; that is to say, the life of the brakeshoe from this reason is about four times that of shoes used against wheels, but the weight of the metal worn away is reduced in the ratio of one-tenth.

With the "L" type of car the brakeshoes can be adjusted while the car is at the end of the line and it is not necessary to put the car over a pit. Brakeshoe renewal takes somewhat longer than with the ordinary type of shoe, but it should be remembered that the shoes wear four times as long as with shoes applied to wheels. The result of experience shows that the total saving in time in shoe renewal amounts to about 50 per cent.



One of the 475 Cars with Bevel Gear Drive in Paris

MOTOR REPAIRS

The replacement of motors on this type of motor car is simple. It is necessary only to remove the four bolts which attach the motor to the chassis and disconnect the intermediate shaft with the elastic coupling. The motor is then dropped down on a hoist and a new motor is inserted in the same way. A change of motors in this way can be accomplished by two men in a half day. If done at night, when the car is not in service, no useful time of the car is lost.

Where wheels are to be turned down on a wheel lathe, the car body is jacked up and the wheels taken out with their gearings. But the motor does not have to be removed from the car. The whole axle, with gear mounting, is then put in the lathe. The time required to dismount a pair of wheels, turn them down and replace them takes the time of two workmen for half a day.

CONCLUSIONS

The following advantages are claimed:

Reduction in total weight of the cars by the elimination of the truck weight. In the car and equipment this amounts to from 15 to 20 per cent in motor cars of the same capacity.

A reduction in the non-flexibly supported weight of the equipment on account of the attachment of the motors to the chassis. This has been figured as a reduction in weight of from 30 to 35 per cent in motor cars of the same capacity.

A reduction in motor size and energy consumption.

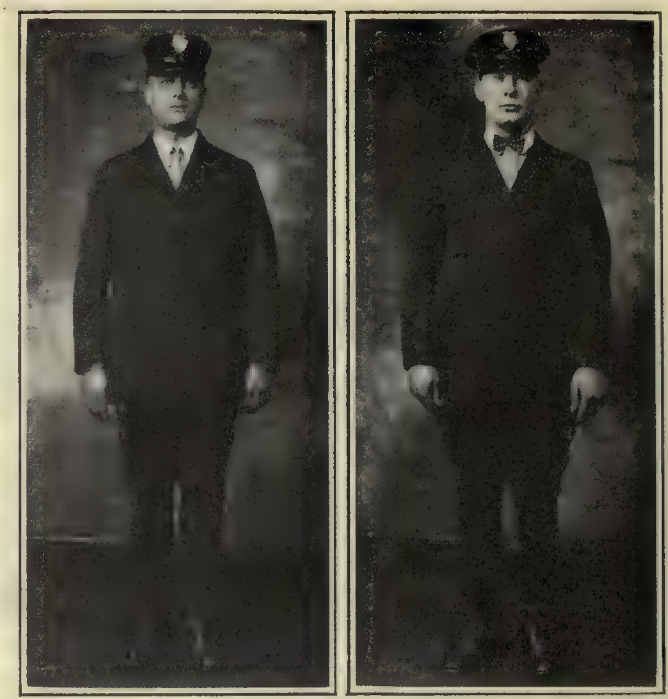
Better braking with reduced effort, reduced weight of braking equipment and reduced wear of brakeshoes; shoe adjustment more easy and less frequent.

Finally, the new type of car, owing to the great latitude permitted as to the length of wheelbase and because of the low floor available with this construction, permits the use of center or end entrances, hence allows a car design which is best adapted to the conditions on each property as well as a seat arrangement best fitted to local conditions. From these advantages it is possible to conclude that this new type of motor car has a definite future.

New Style Uniforms for P-O Men

FINDING that the blue serge or broadcloth, for many years the standard for uniforms, was not only more expensive but harder to keep clean than some of the newer materials, officials of the Pennsylvania-Ohio Electric Company decided to make a change. A sample uniform of gray whipcord was made up for Inspector Enyeart of the Youngstown Municipal lines and in the course of a few weeks he attended several safety committee meetings in Youngstown and also the various cities served by the company.

Two general types of uniform were made standard, one for car operators, consisting of coat, vest and regulation trousers, and one for bus operators, substituting breeches and black puttees for the regulation trousers. Many of the men were so pleased with this change of uniform that they immediately entered their orders for the new suits even before the local stores had an opportunity of stocking up on them. Later the company decided to present each car and bus operator with the initial uniform in order to effect the change as quickly as possible.

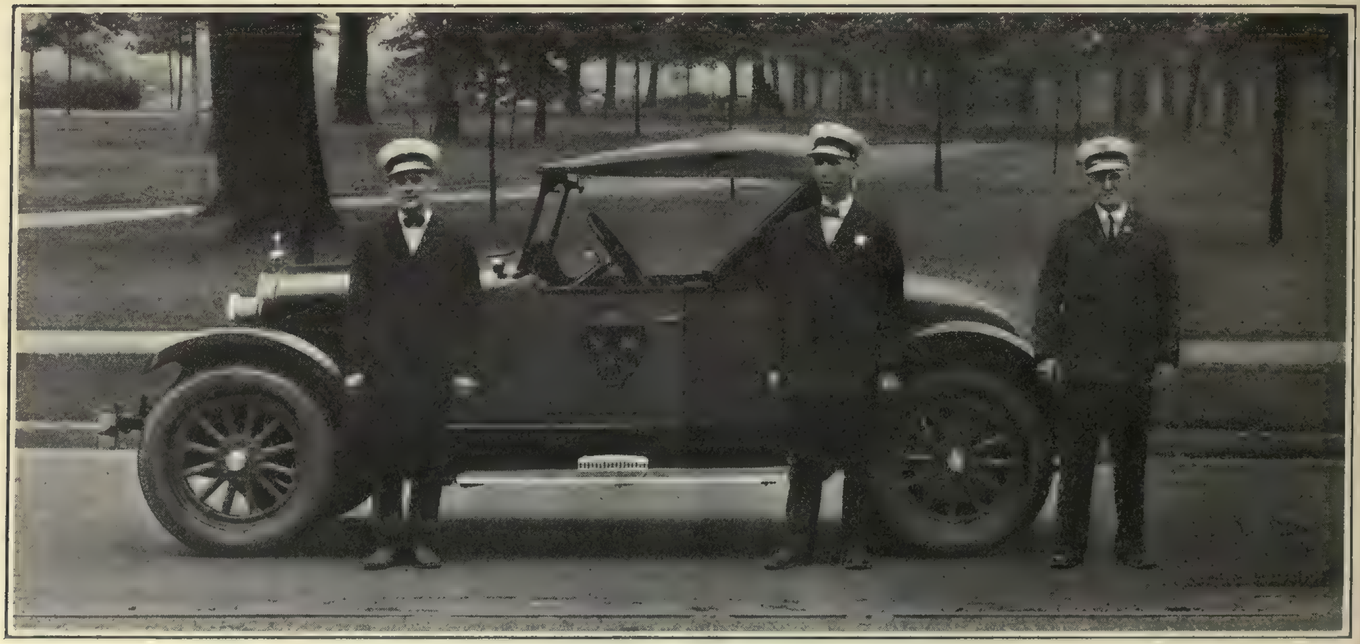


This Gray Whipcord Three-Piece Suit Is Now the Standard of the Pennsylvania-Ohio Electric Company

At left, car operator's uniform. At right, bus operator's.

The accompanying pictures illustrate the standard car operators' type of uniform, the bus operators' and the inspectors' as well. The inspectors' uniform differs in that a white cap is used as a distinguishing mark. On the front of the cap is fastened a metal shield with the insignia of the company. The only place where the trainman's number appears is on the back of the shield, so that it is not visible unless the shield is removed from the cap.

Three of the inspectors are shown standing in front of one of the runabouts assigned to the inspectors. By these cars an inspector may get to a point of trouble quickly. This is considered essential in rendering the quality of service now provided in Youngstown.

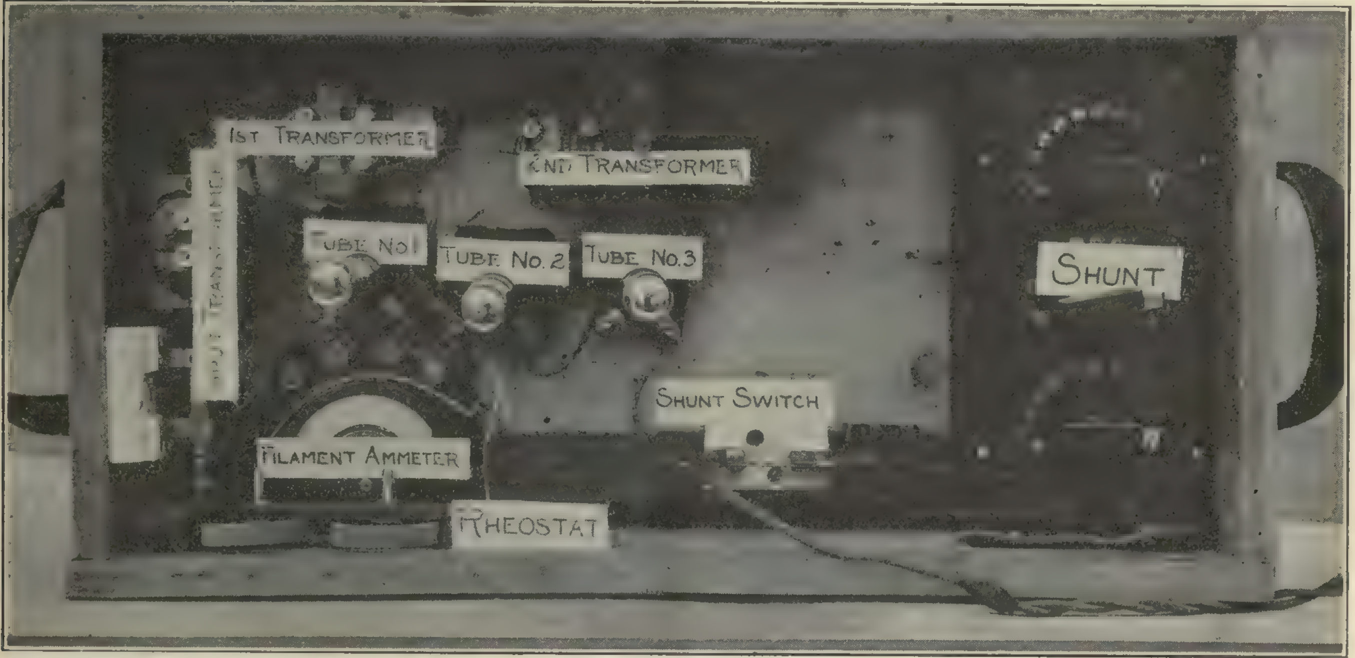


Three of the Seven Inspectors on the Youngstown Municipal Lines Equipped in Their New Standard Uniform of Gray Whipcord. The White Cap Is the Distinguishing Mark of the Inspector. The Runabout Is One of Several Used by Inspectors on Hurry Calls to Points of Trouble

Recording Apparatus Measures Car Noise

Equipment Based on Radio Principles Developed at University of Wisconsin Through Electric Railway Fellowship of Wisconsin Utilities Association — Startling Possibilities Seen in Comparative Tests — Experiments Were Conducted on Several Wisconsin Street Railways

By James Theron Rood and Kent E. Wooldridge†*



The Amplifying and Detecting Apparatus Is Compactly Mounted in a Box so that It Is Portable. Tubes Are Mounted on Flexible Supports to Eliminate the Effect of Vibration

NOISE of street car operation has been measured during the last year by a device developed at the University of Wisconsin. The results indicate many possibilities. Because this work was a part of the preparation of a thesis, it was naturally allotted a limited time. About two-thirds of the year was spent in the development and construction of a practical measuring equipment that would at once be portable and yet practically unaffected by vibration or other extraneous conditions surrounding the actual use of the apparatus. Only a brief period was left available for actual tests, but many noise measurements were made of car operation in Fond du Lac, Sheboygan, Milwaukee and Madison.

EDITOR'S NOTE

Kent E. Wooldridge, a graduate student of the University of Wisconsin, was selected by the Electric Railway Section of the Wisconsin Utilities Association to hold for 1925 the fellowship established by that group of railway operators. The subject assigned was the study of noise in the operation of electric cars.

The work was carried on during the college year, in which time Mr. Wooldridge specialized in electric railway operation under Professor Rood, who spent considerable time with Mr. Wooldridge in the development of this equipment. Results of the tests and a description of the equipment are compiled in a volume that is jointly a report to the association and a thesis on which Mr. Wooldridge received his master's degree.

Since graduation, last June, Mr. Wooldridge has been employed by the Chicago Rapid Transit Company as a cadet engineer.

The results accomplished and the tests made, as given in this article, are of significance in that they indicate the extensive possibilities that can grow out of the further development of this method, rather than in the intrinsic value of the tests themselves.

Investigations in the measurements of sound have heretofore been conducted in laboratories and were of scientific value only. Very recently the telephone companies have made studies and measurements of sound in connection with voice transmission and within the year there have appeared descriptions of similar tests applied to the automotive industry. The work at Wisconsin, however, has been devoted directly to the study of noise produced in electric railway operation, both in regard to its quantity and its source or cause.

The apparatus designed and constructed at the university is based upon the principle of sound amplification used in radio reception. In fact, the equipment is fundamentally a three-tube set with the elements selected to give a fairly constant relationship of sound received to energy measured independent of the frequency or type of the sound waves. This required extensive tests of several types of amplifying transformers and loud speakers as well as studies of tube characteristics to obtain uniform results in the measurements of

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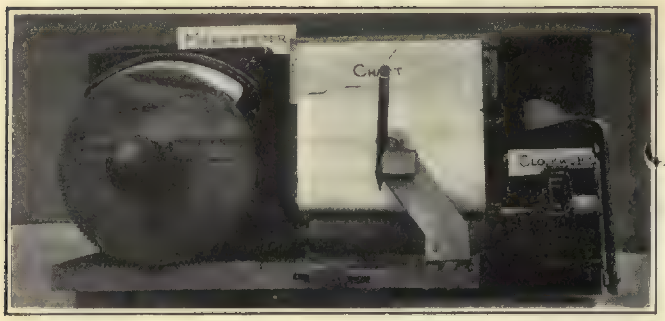
*Professor of electrical engineering University of Wisconsin.
†Chicago Rapid Transit Company.



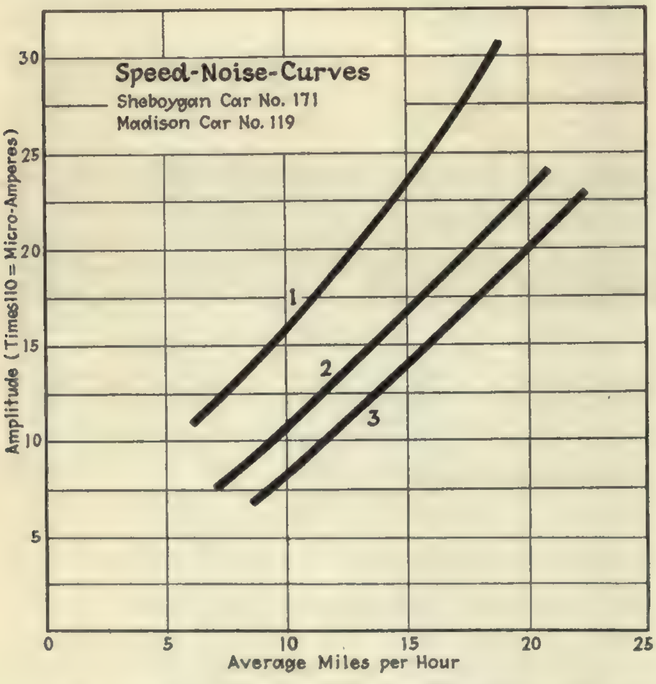
The Graphical Attachment Is Hand Operated

The movements of the micro-ammeter needle are followed by an operator, always keeping the pointer on the gear wheel opposite the needle. The pen attachment, shifted in accordance with the movement of the gear wheel, produces a graph on the paper tape that is moved at a constant rate of speed by the clockwork.

sounds of different frequencies as well as different intensities. The loud speaker was found to give more proportional variation between sound received and sound measured than any other element of the apparatus. It is believed that some of the better microphones used in radio broadcasting have characteristics that would give more uniform results, but such equipment was not available for these tests.

As shown in the wiring diagram, a loud speaker is used for the pick-up of the sound or noise to be measured. The loud speaker element acts as a generator to produce a current of varying intensity in proportion to the sound. This small induced current forms the input to the first of two stages of amplification, two stages of transformer coupling being used. The current is detected or rectified by the third tube. The output is then measured by a micro-ammeter.

In order to produce a graph giving a continuous measurement, a mechanical equipment was constructed that consists of wood gear wheel having approximately the same radius as the ammeter needle. This gear engages in a rack, also constructed of wood, which is connected to a pen that rests on a paper chart moved at a constant rate by clockwork. By moving the gear wheel forward and backward it was found that the variations of the micro-ammeter needle could be followed quite closely, with the result that a continuous record could be obtained of the noise produced over a run as long as desired. The determinations of speed in the tests were only approximate. When the car passed each street corner in a given run an operator marked the edge of the chart correspondingly. The average speed in that block could then be calculated from the known distance covered and the length of the tape, which was proportional to its speed.



Speed-Noise Curves for Three Tests on Two Different Cars Made in Madison and Sheboygan, Wis.

Curves 2 and 3 are on the same car run over different track construction. Curve 3 is for a different car and in a different city.

Curve 1—Madison—72-lb. 6-in. tee rail on wood ties set in 12 in. of concrete reinforced with wire mesh, concrete paving.

Curve 2—Sheboygan—80-lb. A.S.C.E. tee rail on Dayton steel ties in concrete.

Curve 3—Same as curve 2, but with Carey Elastite rail filler used on each side and on the bottom of the rails.

All of the tests made were under like conditions of A, B and C battery voltage so that they were directly comparable. Since there is no standard of noise that can be readily used, the method of using this type of equipment is to establish relative values for different kinds of track construction, different kinds of cars and different kinds of apparatus used on the cars. The values can either be expressed in terms of micro-amperes or in per cent, using one set of conditions as a base.

NOISE MEASUREMENT DATA TAKEN IN SHEBOYGAN AND MADISON, WIS.

Curve	City	Amplitude	Micro-Amperes	Relationship, per Cent
3	Sheboygan	13.9	1,530	100
2	Sheboygan	16.75	1,840	121
1	Madison	23.5	2,585	169

Comparison at 20 m.p.h.

For instance, the apparatus can be set up in a car and operated over different types of track construction on a property and at several speeds, so as to determine the relative value of the noise produced on each.

PRELIMINARY RESULTS PROVE INTERESTING

Several typical examples of tests made are reproduced in curve and tabular form. Certain conclusions have also been made based on the several tests conducted on the different properties in Wisconsin, some of which are of interest:

1. Cars running at the same speed over the same track transmit to a passenger's ear about 33 per cent more noise with the windows open that when they are closed (the apparatus is placed in the car so that the load speaker pick-up is in the center of the car about at the position of a seated passenger's ear). This test gives an indication of the noise-insulating value of the car itself.

2. With the same car run over paved track of the same general type a part of which is constructed with rail insulation of a mastic nature and a part without such insulation, the mastic insulated rail construction showed a reduction of 20 to 25 per cent in noise when running at 20 m.p.h.

3. The noise produced increases at more than twice the rate of speed, roughly in the order of the 1.25 power of the speed.

4. Tests made on cars equipped with different types of gears were considered insufficient to report relative values. It is certain, however, that there is a wide field of opportunity to accomplish noise reduction by the use of quiet running gears. The tests indicate a reduction in noise.

5. Comparisons of tests under widely differing con-

ditions indicate a reduction in noise heard in the car due to the use of monolithic flooring, rubber cushions under the center plates and insulated side sheathing.

NOISE ANALYSIS POSSIBLE WITH OSCILLOGRAPH

A few tests were made to analyze the production of noise over a fraction of a second. The loud speaker pick-up was installed in the middle of a city block and wires were run to the laboratory, where the output circuit of the measuring equipment was connected to an oscillograph. One of the oscillograms is reproduced. The lower curve is a 60-cycle wave from the lighting circuit imposed on the chart for the purpose of measurement. The upper curve is a record of the noise produced as the car passed the loud speaker. Tests such as this may be made of value if further developed in analyzing the types of sounds that all mingled together produce the resultant noise of operation. By the use of harmonic analysis the various frequency components and their relative amplitudes can be determined.

Most of the work done, however, was in the measurement of noise through the deflection of the micro-ammeter needle. Because this is a greatly damped instrument compared to an oscillograph, it responds only to the different volumes of sound produced. When mounted in the car it measures the noise as heard by a car rider. If the same portable equipment were set up on the sidewalk it would measure the effective noise as observed by a person outside. A graph would show an increase in amplitude as the car approached, reaching a peak as the car passed the instrument and tapering off as the car moved away. If the conditions of speed were constant this would give a relative comparison of the noise produced by different cars on the line and might be a fair check as between different kinds of maintenance on the different cars of one type. Likewise the effect of noise-deadening skirts or similar equipment on the car could be accurately determined.

Using the micro-ammeter with the apparatus either in the car or on the curb a speed-noise curve can be produced. By the use of a planimeter the total volume of noise can be measured either per block, per unit of constant speed or for an entire run, as desired.

NOISE STUDY AN IMPORTANT FACTOR TODAY

With the coming of the automobile people have become educated to different ideals. Comparisons of street cars today with rubber-tired vehicles bring out clearly the noise feature as one of importance. The human ear is too inaccurate to compare results and it seems imperative that accurate noise measurements must be used in the improvement of car operation. While the actual energy wasted in the production of noise may be small, it may point to equipment defects and is certainly the conscious or unconscious cause of great irritation to those who ride the cars or who live near a car line.

As the elimination of noise primarily requires elimination of the cause a certain amount will always remain. Of secondary importance is the problem of deadening or absorbing the noise produced and the elimination of features that reinforce the noise.

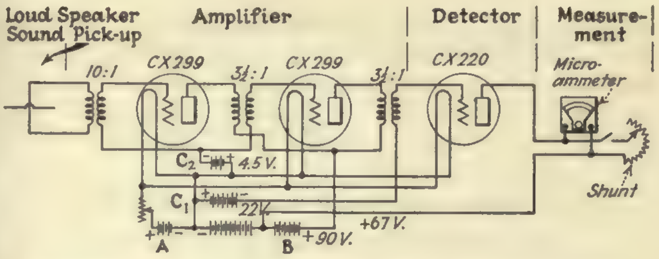


Diagram Illustrating Apparatus and Connections of the Sound Measuring Equipment

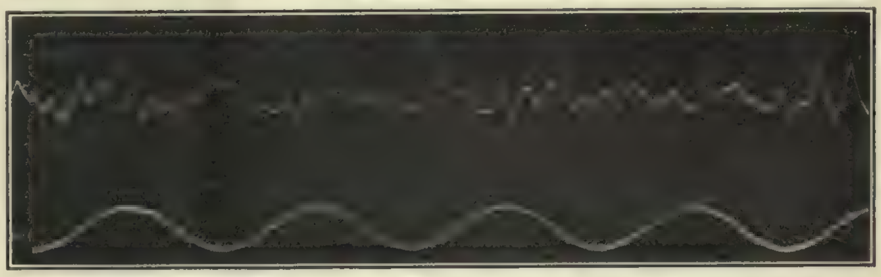
The input at the left is through a loud speaker. The small current developed in the coils of the elemenet through the vibrations of the diaphragm is amplified in two stages, then is detected or rectified and measured by the micro-ammeter.

Roughly, noises can be divided into several types, depending on the source. The first is that coming from the track itself and concerned with it are the types of ties, ballast and paving. The contact of the wheel and rail is a second source. Other sources of noise lie in the trucks, brake rigging, motors and gearing, and the air compressor. The current-collecting equipment is still another source. Noise may originate in the car body, but of greater importance is the sounding-board and resonant effect of the body in amplifying noise produced elsewhere.

So the problem resolves itself into two major parts: (1) The source, and (2) the amplifying or transmitting powers of the equipment and track structure used.

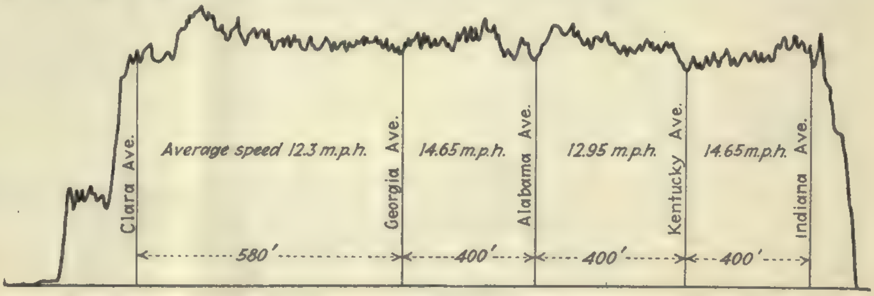
It is hoped that the equipment as developed and the tests described may be helpful in furthering the studies of noise reduction in electric railway operation along broad commercial lines.

So successful has this work been that the Wisconsin



By the Use of an Oscillograph an Analysis of Noise May Be Made

This reproduction of an oscillograph chart covers about 1/20 of a second. The lower curve is the 60-cycle wave imposed on the chart for time measurement, the upper curve is the resultant noise. Analysis of this chart presents interesting possibilities in determining the different elements producing noise.



A Typical Graph Produced in a Measurement Taken in One of the Cars at Sheboygan, Wis.

Average speeds are calculated from the length of paper consumed and the distance between streets being measured. Average noise volume is measured by obtaining the area of this speed-noise chart by means of a planimeter. This chart was taken in a Birney car run at moderate speed. Complete tests were made at different speeds.

Utilities Association plans to continue this work the next college year with Edwin R. Summers, who has been appointed electric railway fellow and will receive the award of $500 offered by the Electric Railway Section of the Wisconsin Utilities Association.

100 Trains Are Moved Simultaneously by Long Island Each Morning

VERY effective advertising is being addressed by the Long Island Railroad "to those who commute" on that road. Especially interesting are some of the facts spread broadcast about the extent of the company's electrification program, particularly within the limits of the city of New York. Of this the company said:

> All freight and passenger service located within the city limits must, according to state law, be operated by other than steam power by Jan. 1, 1931. This means that steam locomotives cannot be used to haul passenger and freight trains or for switching cars.
>
> In order to carry out this requirement of the law the Long Island Railroad must spend about $13,000,000 on a program which has already been approved by the Public Service Commission. Not only main tracks but also yards, sidings, float bridge approaches and shops must be equipped for electrical operation.
>
> Electric locomotives must also be provided to haul through passenger trains to Jamaica instead of Long Island City for interchange with steam locomotives. Later on arrangements must be made to keep steam locomotives out of Jamaica. Large capital expenditures must be made, too, for power house and substation equipment.

To relieve congestion at terminals and on trains during rush hours three things are recommended:

> 1. Adoption of the plan to establish a new terminal at Diagonal Street, in Long Island City. This project can be completed within twelve months from the time the city authorities give their sanction to proceed with the work.
>
> 2. Co-operation with the so-called stagger plan now being proposed by the Department of Health, city of New York.
>
> 3. Prompt extension of the city's proposed subway line to Jamaica.

About 1,200 passenger trains are moved over the Long Island Railroad every day. They carry between 275,000 and 400,000 passengers daily. At 8 a.m. approximately 100 trains are moving simultaneously.

More Passengers in Milwaukee

COINCIDENT with the distribution of the regular quarterly dividend of $1.75 per share to the 11,126 customer owners of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., S. B. Way, president, announced that $8,541,000 of 6 per cent refunding first mortgage bonds had been called for redemption as of Sept. 1 and that they will be refunded with 5 per cent bonds. During the fore part of the year the capital structure of the company was materially strengthened through the retirement of a part of its funded debt. Bonds now constitute 55 per cent of the total capitalization.

In a statement which accompanied dividend checks Mr. Way declared that the company experienced a striking growth in business by its electric railway and electrical departments. For the first six months of this year the number of railway and bus passengers jumped to 106,706,000, against 102,498,000 carried for the first part of 1925, a gain of about 4 per cent. This increase in traffic is attributed to the difficulty which motorists are experiencing in parking their cars in the restricted business district and to the introduction of increased service through the use of additional one-man cars.

Teaching Safety Lessons in Minnesota

PUBLIC attention was arrested in St. Paul, Minn., recently by a street car of the Twin City Rapid Transit Company which was thoroughly bedecked with safety slogans to induce closer observation of Safety Week in that city. Among the labels on the cars were such ominous warnings as: "Accidents Make Many Orphans," "Co-operation Means Your Safety and Ours —Watch Your Step," "This Car Weighs 20 Tons—Give It a Chance," and others. As a selling appeal for street car transportation the care bore along the edge of the roof at each side the slogan, "The Safest Place Upon the Street." The car was operated over all of the lines in St. Paul and caused much discussion on the part of the public.

The St. Paul Safety Car Carries Its Own Messages

Cleveland Railway Extends the Use of Automatic Substations

SECOND ARTICLE

By L. D. Bale

Superintendent of Power the Cleveland Railway

Experience with Earlier Equipment Helped in Layout of Stations and Building Design—Standard 1,500-Kw. Converters Are Used Throughout—Steel Barriers Isolate High-Tension Equipment—Reliability Features Entire Design

General View on the Main Floor of a Two-Converter Substation, One of Seven Recently Constructed by the Cleveland Railway
Against the rear wall is a steel cabinet which contains the converter low-tension starting switches, the pneumatic contactors for shunting resistance into the converter circuit and the substation's remote control cabinet.

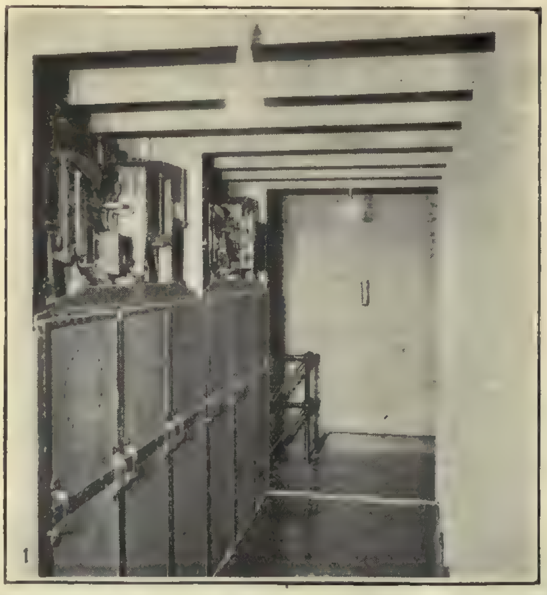
BASED upon experience gained in the operation and maintenance of the three stations of the earlier type an extensive study was conducted to determine the actual requirements of a building which would most economically house the equipment comprising an automatically controlled substation. Accordingly a layout was devised wherein the areas within the building were utilized to the fullest advantage, resulting in a very compact arrangement, with, however, ample clearance for safe operation and maintenance of all equipment.

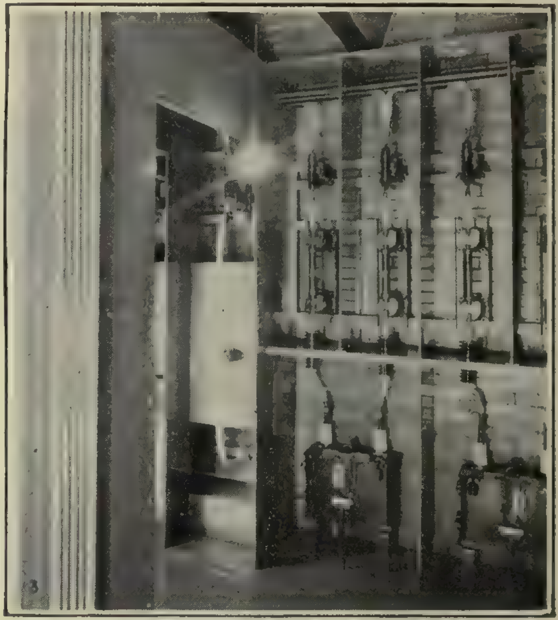
The seven new substation buildings are identical as to interior arrangements and dimensions. The exteriors, however, were varied somewhat regarding architectural details and texture of face brick in order to agree with surrounding structures. In one instance, station No. 15, the station proper is situated on one corner of a large plot of ground upon which it is in-

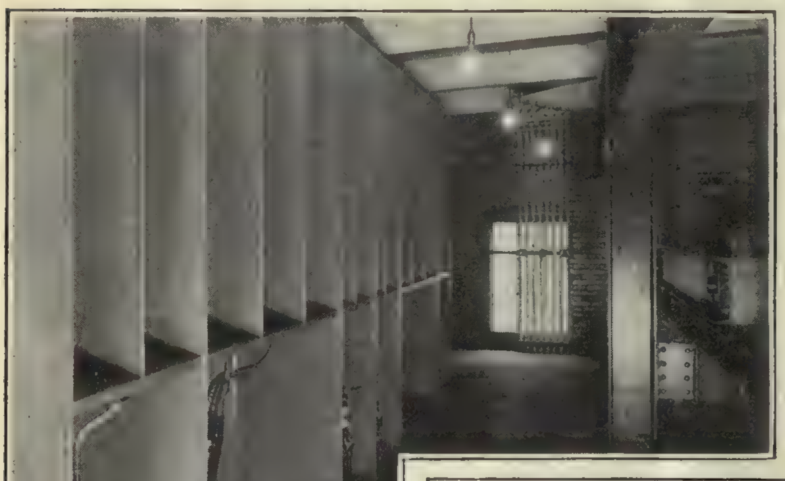
High-Tension Details of Cleveland's New Automatic Substation

No. 1. The main 11,000-volt oil switches controlling each of the two incoming underground lines are installed on the mezzanine floor. Steel barriers provide phase isolation.

No. 2. A general view of the mezzanine floor, showing the steel barriers to the left and the end of the crane over the main operating room to the right.

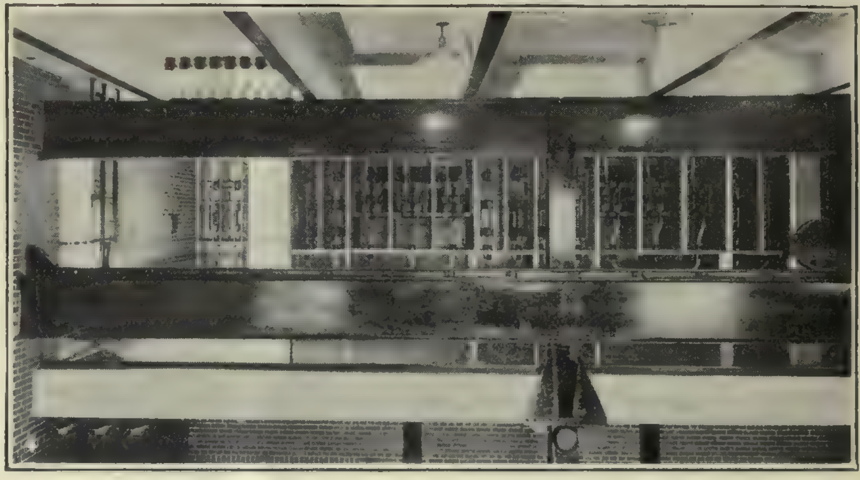






No. 3. Another view on the high-tension balcony showing a further use of the steel barriers for phase isolation. These steel barriers were constructed on a template and are therefore interchangeable.

No. 4. Looking into the mezzanine floor, showing a general view of the high-tension compartment.

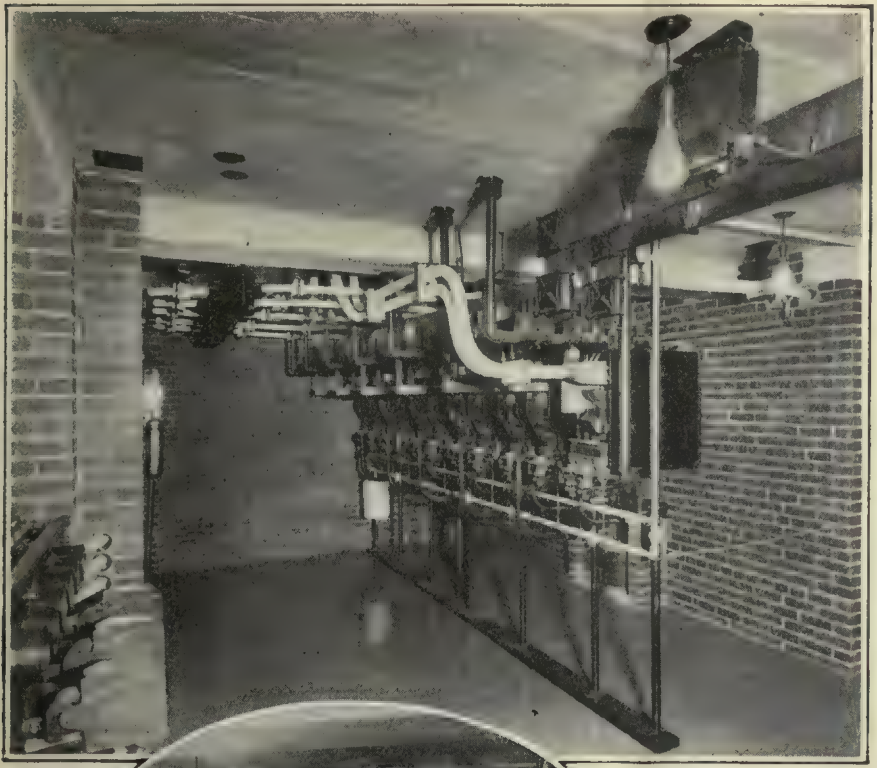


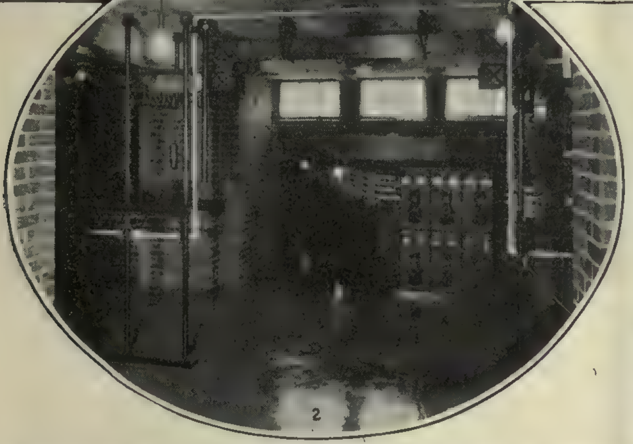
tended to erect a three or four story power department service building. The walls of this substation building are to be incorporated in the proposed structure and were, therefore, arranged accordingly. With the exception of the latter station all the buildings are surrounded with more or less lawn space and further enhanced in appearance by the use of shrubbery.

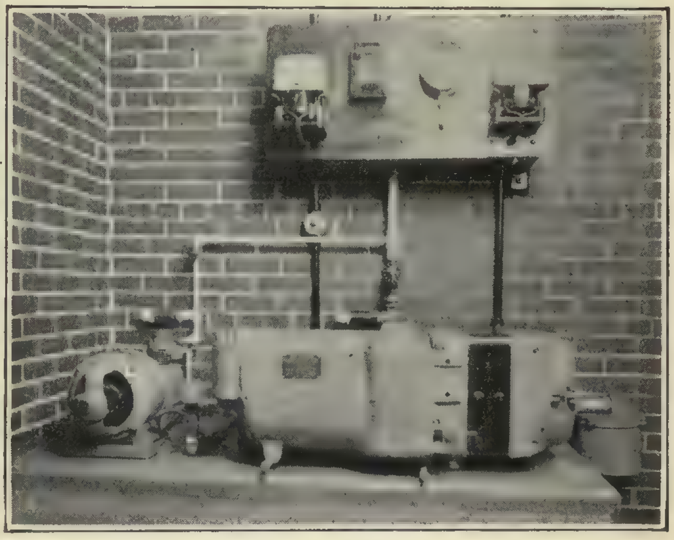
The dimensions of these buildings are 36 ft. 10 in. wide by 39 ft. 1 in. deep by 40 ft. 7 in. from basement floor to underside of roof steel. Each building contains 44,000 cu.ft. This is equivalent to 14.6 cu.ft. per kilowatt of installed capacity, based upon 3,000 kw. This represents a 45 per cent reduction in cubical content compared with the earlier type of automatic substation building on the system. The buildings are of fireproof construction throughout and are completely equipped with all necessary facilities, including 15-ton, hand-operated, bridge-type cranes.

The method adopted for the natural ventilation of these stations is similar to that of the former automatic substations. Briefly, this arrangement consists of a large ventilating area under the converters, which extends across the width of the building. This area is connected with the exterior of the building at each end by means of air wells. Much of the warm air from the converters is carried out of the building by way of this area. Openings are provided under the front entrance from which ventilation is furnished for the main operating floor through floor gratings, in addition to air from the basement area through the stair well. Heated air is exhausted from this portion of the building through a 56-in. ventilator located on the roof in line with the magnet frames of the converters. Station No. 14 is an exception, inasmuch as three 36-in. ventilators have been provided, grouped in line with the converters. The elimination of the transformers from the building proper and the placing of the current-limiting resistance on the roof simplify the problem of ventilation.

It will be noted, by referring to the longitudinal sec-







In the Basement of the Cleveland Automatic Substation Is Installed the D.C. Connections and Auxiliary Equipment

No. 1. Directly below the converter in the basement is installed a pneumatically operated positive converter contactor and the main and auxiliary d.c. contactors. This view shows the equipment for a substation with one 1,500-kw. unit. A second set of contactors is added in stations with two units.

No. 2. At the entrance to the outgoing d.c. feeder tunnel is installed a negative drainage panel for the mitigation of electrolysis.

No. 3. In the basement near the compressors are two air storage tanks each of 11.2 cu.ft. capacity. One is used for the operation of pneumatically operated contactors and the other for air cleaning around the station. A governor is arranged so that the tanks used for the operation of the contactors is not depleted. The middle cylinder is a dehydrator and contains 2.2 cu.ft. of calcium chloride, which lasts five months. By chemical analysis 70 per cent of the moisture in the air used in the operation of the station is removed by this process.

No. 4. Two air compressors are installed. The large one, generally used, is a standard 25-cu.ft. car type compressor supplying air to two reservoir tanks. In case of total failure of the station the small auxiliary unit shown at the left is available. This consists of a 3-cu.ft. compressor driven by a 110-volt motor using energy from the station storage battery.

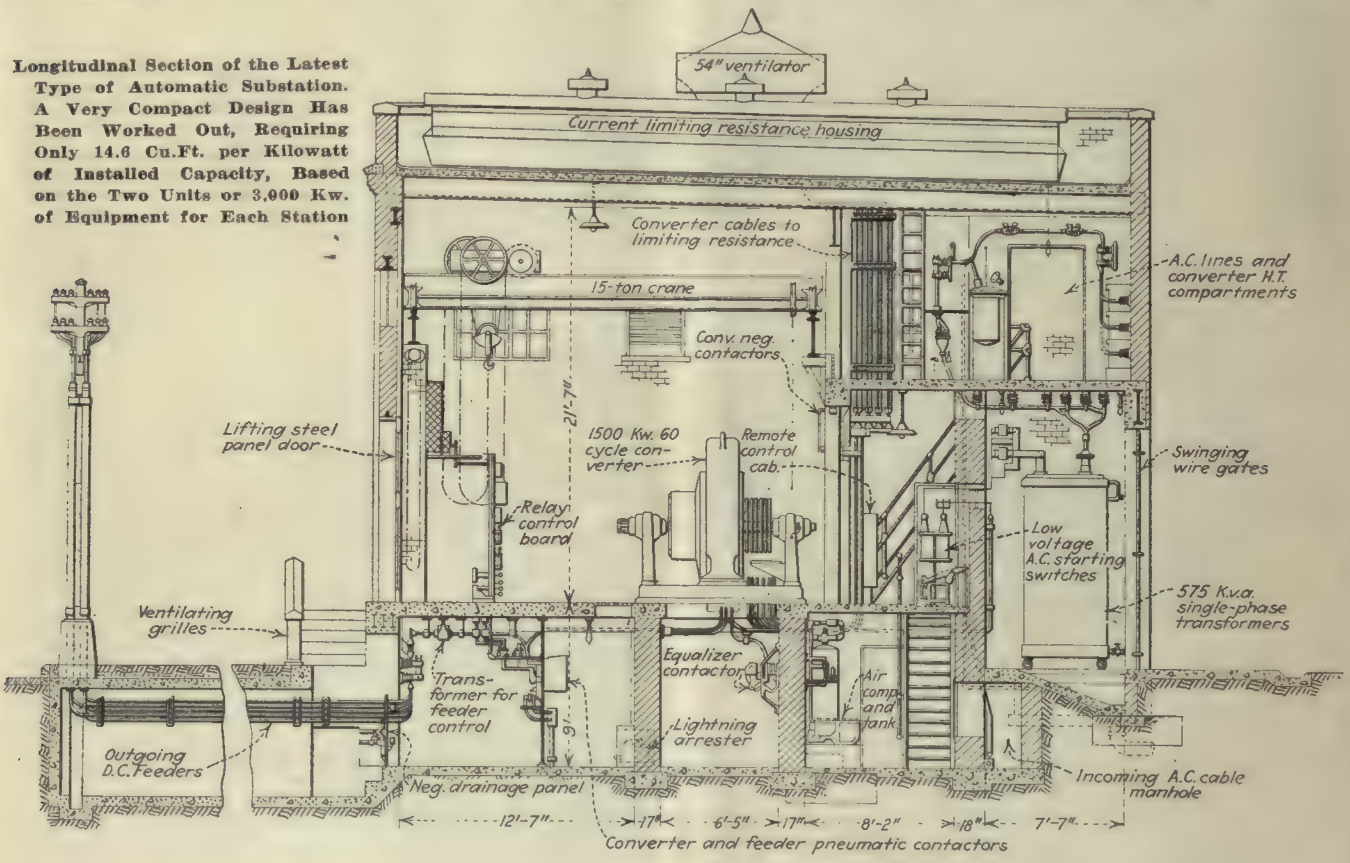
tion drawing, that the building may be divided into five general sections based upon the grouping of the equipment. These divisions and the principal items of equipment which they contain are as follows: Main or operating floor, control board and converters; basement, all outgoing direct-current cables and contactors, positive converter contactors, direct-current buses and a majority of the station auxiliaries; mezzanine, all high-tension switching equipment, high-tension bus structure, etc.; transformer vaults, the main static transformers; roof, all current-limiting resistances.

The alternating-current supply, as is customary on this system, is obtained through duplicate underground 11,000-volt, three-phase, 60-cycle, grounded neutral lines, normally tied in parallel through the a.c. bus at the substation end. Each line is of sufficient capacity for the supply of both converters at rated load. The lines are protected by inverse-time-limit overload relays at the generating plant, while at the substation only instantaneous reverse-power relays are installed. This arrangement allows either of the a.c. lines to be disconnected, through routine operation or by reason of trouble occurring upon them, without interfering with the continuity of service of the station. Each line is connected with the a.c. bus at the substation through a 600-amp. oil circuit breaker, non-automatic except through the action of the reverse-power relay.

All high-tension equipment is isolated from the remainder of the building by its location on the mezzanine floor, which is utilized only for this purpose.

The use of all-steel barriers, shown in four of the illustrations, was resorted to in order to economize space and to produce an economical high-tension bus and phase-isolating structure. These barriers were laid out with templates and, therefore, the various sections are interchangeable. Erection of this type of barrier not only facilitated construction but produced a satisfactory, light-weight structure at about half the cost of the customary brick and stone compartments.

Connection from the converter high-tension oil switch is made to the single-phase, 550-kva. power transformers located directly beneath. These transformers are oil-insulated and self-cooled. They are arranged three to a compartment, with facilities for natural ventilation and the drainage of oil.


54" ventilator
Current limiting resistance housing
Converter cables to limiting resistance
15-ton crane
Conv. neg. contactors
A.C. lines and converter H.T. compartments
Lifting steel panel door
21'-7"
1500 Kw. 60 cycle converter
Remote control cab.
Swinging wire gates
Relay control board
Low voltage A.C. starting switches
575 K.v.a. single-phase transformers
Ventilating grilles
Equalizer contactor
Trans-former for feeder control
9'
Air comp. and tank
Lightning arrester
Outgoing D.C. Feeders
Neg. drainage panel
Incoming A.C. cable manhole
12'-7"
17"
6'-5"
17"
8'-2"
18"
7'-7"
Converter and feeder pneumatic contactors

Longitudinal Section of the Latest Type of Automatic Substation. A Very Compact Design Has Been Worked Out, Requiring Only 14.6 Cu.Ft. per Kilowatt of Installed Capacity, Based on the Two Units or 3,000 Kw. of Equipment for Each Station

The starting and running connections between the transformer secondaries and the 1,500-kw. converter are made through two 2,000-amp., heavy-duty, solenoid-operated oil circuit breakers. These breakers are inclosed in a steel cabinet, provided with oil drains and located on the main operating floor on the opposite side of the transformer vault wall.

The d.c. energy for both converter and outgoing feeders is handled through electro-pneumatically operated contactors similar to those utilized in electric locomotive work. One of the illustrations shows a typical rack containing the main positive contactor, connecting the converter to the main bus, and the main and auxiliary feeder contactors for one-half of the outgoing d.c. feeders of the station. The controlling relays, etc., for these contactors are mounted on the main control board on the floor above.

The conditions leading up to the adoption of the electro-pneumatic contactor in preference to the magnetically operated contactor are of interest. This latter contactor is more or less standard equipment for automatic substation use, but it has the disadvantage of possessing a relatively high drop-out point and pick-up point expressed in per cent of solenoid operating voltage. Adoption of the magnetically operated contactor for the control of outgoing d.c. feeders to a railway system on which a large proportion of the conversion equipment consists of automatic substations of relatively small capacity would result in a situation where, in the event of trouble affecting one or more stations in an area, under peak-load conditions, the potential on the buses of the station affected would likely become sufficiently low to allow the contactors to unseal or drop open, thus isolating the station or area. It was deemed advisable, since the program of the railway calls for complete automatization, to discontinue the use of a contactor which was subject to the above difficulties and adopt one whose operation would be independent of voltage conditions of the station bus.

Air supply for the operation of pneumatic contactors is obtained from a standard 25-cu.ft., 600-volt d.c. car type compressor as a main source. A 3-cu.ft. compressor, operating from the 110-volt station control battery, is installed for emergency purposes and automatically cuts in on the failure of the main compressor. These compressors are illustrated herewith.

The air storage consists of two 11.2-cu.ft. tanks. One tank comprises the main reservoir from which air is supplied for the operation of contactors. The second tank furnishes air at reduced pressure for cleaning purposes about the station. The air flow between tanks is controlled through an auxiliary devices governor, thus assuring that the pressure of the main reservoir will not be lowered to a point which would jeopardize the successful operation of contactor during cleaning periods.

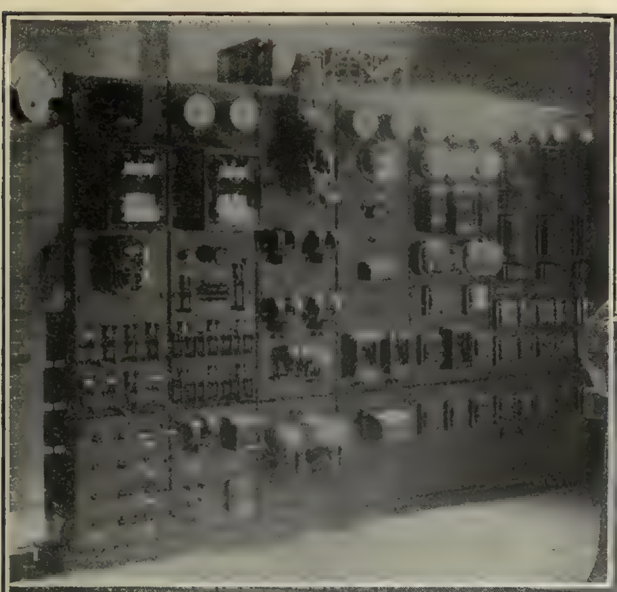
In the initial operation of these stations considerable difficulty was experienced with the high moisture content of the air delivered to the contactors. This resulted in corrosion of the piping system and the pistons,

Switchboards Are Well Balanced

No. 1. On the right control board, from left to right, the first two panels contain the control for station auxiliaries and lighting switches for the main control circuits of the converters, wattmeter sender for remote metering, curve drawing voltmeter, etc. The next three panels contain control for one converter and the remaining three panels control five outgoing d.c. feeders.

No. 2. The two control boards for a two-unit, automatic substation are separated by the main doorway.

No. 3. A near view of the left control board for a 1,500-kw. automatically operated rotor converter. From right to left, the first two panels contain the control equipment for the incoming a.c. line; the third, fourth and fifth panels control the converter, and the sixth and seventh control the four outgoing d.c. feeders. The eighth panel on the left has mounted on it the air-operated sequence drum used to obtain simultaneous operation of the contactors of both units in the station



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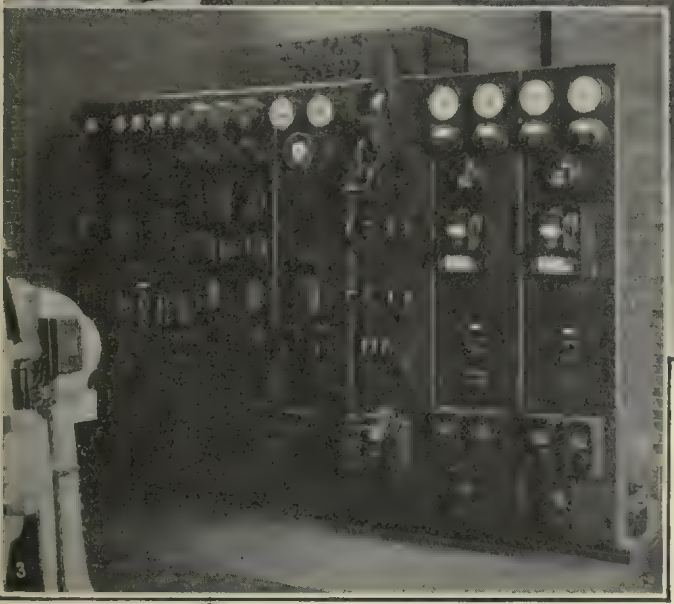

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cylinders and control valves of the contactors. Experiments were conducted, using various mechanical moisture extractors, with little or no success, primarily due to the extremely small flow of air occasioned by the operation of a contactor. The elimination of moisture was finally attained by the use of a chemical dehydrator. This contains 2.2 cu.ft. of calcium chloride. On the average, as determined by chemical analysis, it removes 70 per cent of the moisture during the five months life of one charge of chemical. The air reservoirs with the dehydrator in the foreground are shown in one of the pictures.

The current-limiting resistance is arranged in three steps, with values calculated to give operation continuously, or nearly so, thus assuring continuous operation of converters in the event of undue or severe overloads. This resistance is shunted into the negative side of the converters by pneumatically operated contactors shown in one of the illustrations.

A heavy-duty current-limiting resistance is normally connected between the two positive buses of the station, main and auxiliary. The object of this is to supply energy to the auxiliary bus for the clearing of faulty feeders which have been automatically transferred from the main bus to the auxiliary bus as a result of short-circuit conditions. This resistance is under the control of the dispatcher. Energy through it may be supplemented or augmented by tie feeders transferred by the dispatcher from the main to the auxiliary bus.

All current-limiting resistance is located in steel cabs on the roof of the building. The maximum of natural ventilation is afforded in this position, in addition to keeping the building cubical content down to a minmum. The steel cabs containing the resistance grids are illustrated herewith. The control of resistance-shunting

Directly Underneath the Converter Is a Large Ventilating Area. The D.C. Connections and the Positive Converter Contactor Are Seen

contactors, where two converters are located in the same plant, has in several instances presented a problem. This was due to the difficulty of securing simultaneous operation; i.e., of preventing pumping of contactors (interchange of load) of the two units when subjected to overload. This phase of the control has been decidedly simplified in the stations under discussion by the utilization of an electro-pneumatic sequence drum in connection with the pneumatic contactors. Control of the contactors of both units through the action of this drum insures their simultaneous operation. Sensitive relays, which function in conjunction with transformers located in the main leads of the converters, control the operation of the sequence drum. This device is an adaptation of the "notching-up" relay used in automatic acceleration of multiple car unit equipment.

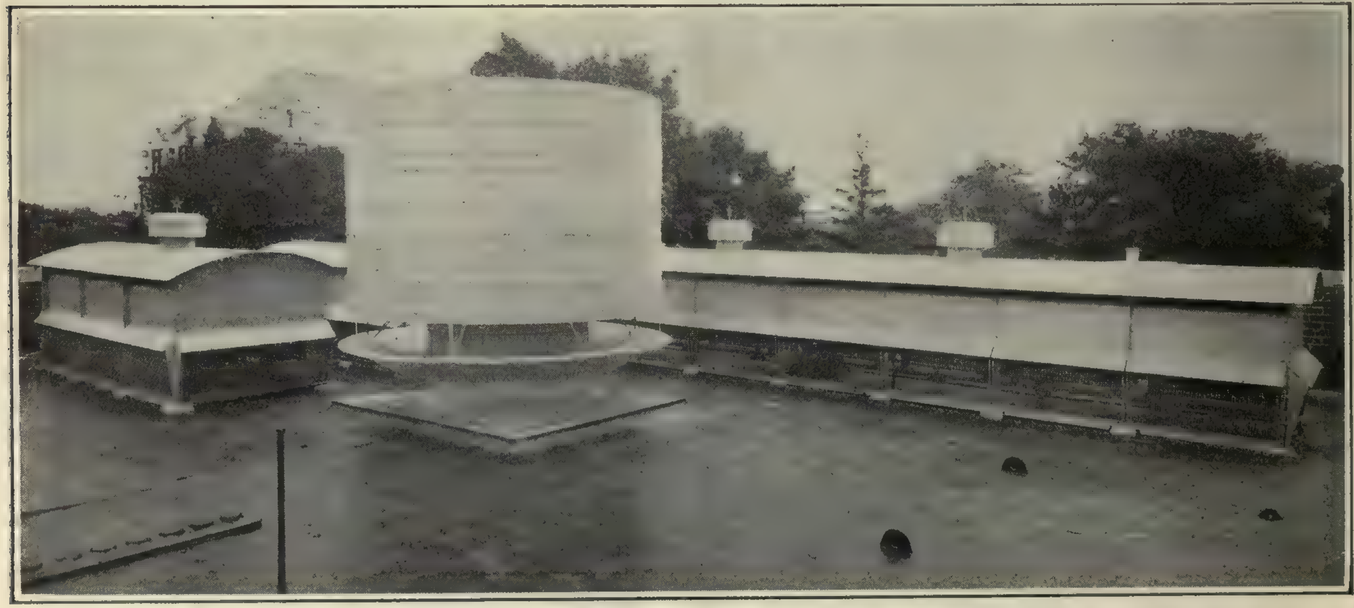
It will be noted that the main control board is structurally balanced, thus presenting a pleasing appearance. This board contains the control of all major and auxiliary equipment of the station. No heavy-duty buses or equipment are mounted on it, with the exception of one manual circuit breaker per converter, which is operated only in the event of overspeed of the converter.

Each station is complete with a 125-volt, 150-amp.-hr. storage battery, floated on the control bus with a differentially wound, 5-kw. motor-generator set. A center tap is taken off this battery for the supply of energy of the remote control and supervisory system. The combination of the battery and motor-generator set supplies a dependable source of energy for the operation of important items of converter and, particularly, feeder controls which must be depended on to operate satisfactorily over a rather wide range of conditions.

The small contactor board shown in the center background of the illustration on page 419 comprises the negative drainage board. This is standard equipment in all the Cleveland Railway substations. It is utilized to control the connections between subterranean structures (pipes, cable sheaths, etc.) and the station negative bus for the mitigation of electrolysis. The rail connections from the station negative bus are tapped to rails at points sufficiently distant to establish an area immediately adjacent to the station in which underground structures are drained. The potential difference of, and the current flow over, underground structures may be varied if desirable by the introduction of resistance in the connections.

Automatic Parcel System for Chicago

THE Chicago Rapid Transit Company has lately installed steel lockers known as the "Automatic Parcel System" at all Loop stations. They are placed at convenient points either in the stations proper or on the platforms. Each locker is individual and the keys are numbered to correspond with the number on the locker. The shopper places his, or her, package in the locker, drops a dime in the slot in the lock, turns the key and carries it away as a check. All that is necessary to obtain the package is to insert the key and open the locker. Hundreds of shoppers are using these lockers.



On the Roof of the Substation Is a 54-In. Ventilator and the Current-Limiting Resistance, Mounted in a Steel Cab

The bus tie resistance used to burn off short circuits on the line is also shown. This view was taken on the roof of a single-converter station. Duplicate equipment of resistances is installed on two converter substations.

Maintenance Notes

Lubrication Basis for Gears and Pinions

DESIRABLE inspection and lubrication periods for gearing were discussed at the semi-annual meeting of the Electric Railway Association of Equipment Men, Southern Properties. Of the various railways reporting, Knoxville inspects gearing and puts in gear compound every 30 days. Chattanooga makes an inspection at from 800 to 1,000 miles and lubricates if necessary.

Memphis and Little Rock have inspections every week and apply grease when needed. New Orleans has a 1,000-mile inspection basis, with lubrication when needed. Dallas inspects every 1,500 to 2,000 miles in interurban services and every 500 miles on city cars. This company has found that weather conditions have much to do with the lubrication and so it does this work when necessary. Birmingham has a 1,000-mile inspection period and lubricates every 60 days during warm weather. The company has found that safety cars do not need lubrication as often as other cars operated, the period for these usually running about 90 days. Mobile makes a weekly inspection and lubricates when necessary. Atlanta lubricates every 1,000 miles.

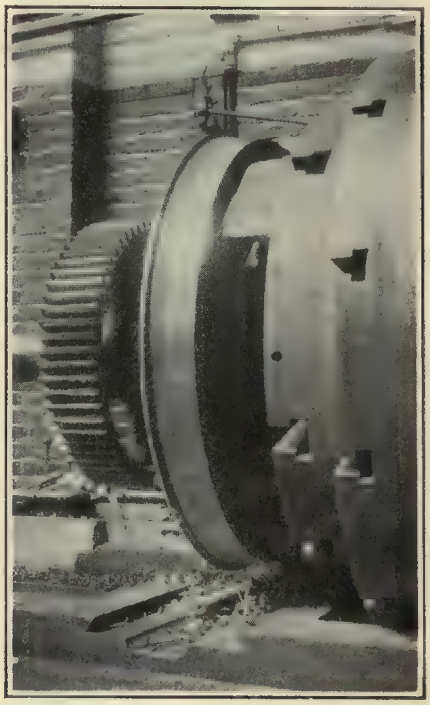
Canvas Liners Reduce Brake Rigging Noise

PIECES of canvas soaked in linseed oil paint are placed between brakeshoe heads and their hangers and at connections to brakeshoe beams on cars of the Department of Street Railways, Detroit, Mich. These canvas pads cut down vibration and so reduce noise. This method of installation insures a full surface contact and makes a tighter fit, so there is less danger of bolts and nuts working loose. The company also uses fine thread bolts which are S.A.E. standard, as it has been found that they have less tendency to work loose under vibration. Standard roofing canvas is used for the shims.

Installing a Canvas Pad at the Center Connection to the Brake Beam in the Shops of the Department of Street Railways, Detroit, Mich.

Machining Steel Wheels Before Building Up

REVERSING the usual process with regard to machining and building up car wheels by means of welding, the Holyoke Street Railway, Holyoke, Mass., follows the practice of first machining the wheels to approximately the right cross section across the tread and then building up around the flange to restore the desired section throughout. The major portion of metal is turned from inside of the tread, adjoining the flange, thus making it possible to obtain a smooth tread with a minimum loss of metal. The welding process which follows simply restores the flange to the proper thickness and shape.



Turning a Steel Wheel Before Building Up with the Welding Process

It has been found possible to build up the flange with such accuracy that only a slight amount of turning is necessary to finish the surface and complete the operation. In the accompanying illustration a wheel is shown after the preliminary machining has been accomplished and the wheel made ready for the building up process.

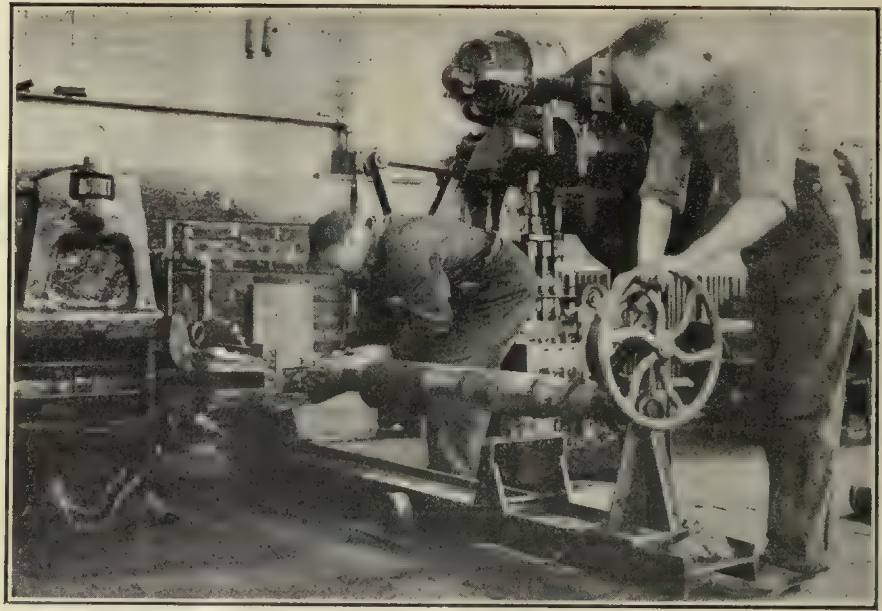
Using Oversize Steel Sleeves on Armature Shafts

MANY railway properties have adopted the practice of shrinking steel sleeves on worn armature shafts, thus bringing the diameter back to size. The Concord Electric Railways, Concord, N. H., however, is perhaps the first to use sleeves with an outside oversize dimension. After the armature shafts on that property have worn down to a minimum diameter of ⅛ in. below the standard a Shelby seamless steel tube with an outside diameter of from ⅜ in. to ¼ in. over the normal dimension is shrunk on the shaft, its length being sufficient to fit snugly in under the thrust collar.

On the Right Is One of the Solid Brass Bearings, While a Section of Seamless Steel Tubing Used for a Sleeve on the Armature Shaft Is Shown on the Left

Solid brass bearings, made by the J. F. Hodgkins Company, Gardiner, Me., are used with the armature shafts which have been treated in this fashion. These were adopted when it was found that the babbitted steel bearings normally used were not entirely satisfactory for use with the oversize shafts. The motors are of the GE-67 type, specially equipped with Ransom vacuum oilers.

Occasionally a thrust collar will become worn before the oversize sleeve has again been worn down to the standard diameter. When this happens, making it necessary to remove the collar, the shaft is machined to normal size, the collar is removed and the armature may be operated with regular babbitted bearings. Generally, however, it has been found that the thrust collars remain in fairly sound condition and need not be changed during the life of the reconditioned shaft. The tubing is purchased in long sections and cut to size when needed.



Bent Axle Being Straightened by Use of an Old Wheel Press in the Cleveland Railway Shop

Wheel Press Used to Straighten Bent Axles

STRAIGHTENING of axles is done in the shop of the Cleveland Railway with the assistance of an old wheel press. The special attachments for doing this work were described in the ELECTRIC RAILWAY JOURNAL for Oct. 19, 1918. As shown in the accompanying view, the axle is first mounted on a portable carrier, fitted so that it may be revolved. A workman seen at the right can revolve the armature quite rapidly by means of a hand wheel which turns the axle through a gear and pinion. The workman to the left holding a piece of chalk can mark the section that is out of line. The axle is placed against two horizontal supports seen to the left. When the axle is accurately placed against these supports the thrust arm of the wheel press is advanced against the axle. This process of measurement and straightening is repeated until the axle is straightened.

Portable Slotter Used in Huntington

UNDERCUTTING of mica on commutators is done by a small circular saw driven by a motor through a flexible connection in the repair shop of the Ohio Valley Elec-

Portable Undercutting Slotter Used in Huntington, W. Va.

tric Railway at Huntington, W. Va. The saw is held in a heavy handle as shown in the illustration. It is moved along the slot by hand and guided by eye. The driving motor is supported in a hanger from a rig that is movable within a limited range.

New Housings for Los Angeles Railway Motors

EXCESSIVE wear of bearings and motor frames, together with frequent troubles with babbitt-lined bearings, has caused the engineering department of the Los Angeles Railway, Los Angeles, Cal., to inaugurate an extensive program for the rehabilitation of its Westinghouse 306-L railway motors. The company has 710 of this type in operation which have been in service since 1910.

The work to be done will include the boring out of the motor frames and the installing of new housings. The new housings are patterned somewhat after the design used by the Public Service Railway of New Jersey, which was described in the ELECTRIC RAILWAY JOURNAL, Dec. 20, 1924. In addition to providing new housings, the motors will have solid Kelley metal bearings and Rico oilers.

These motors have a large porthole in the motor frame at the commutator end. Trouble has been experienced in wet weather from water and mud entering this opening and causing grounds or short circuits of fields. A test of the temperature rise during the summer season on motors was made with the portholes covered up, and it was found that they could be operated without undue heating if the hole was done away with, so the new design provides for the elimination of this.

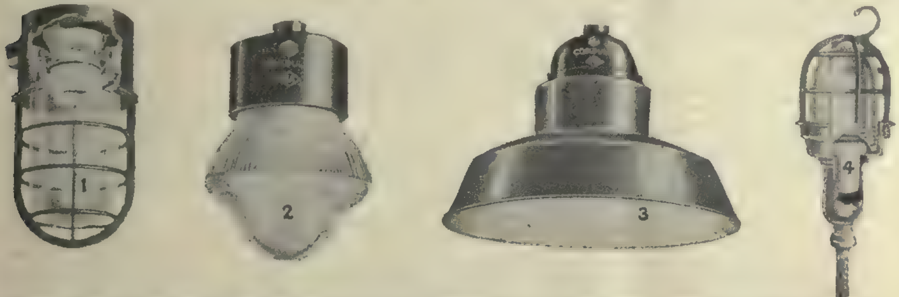
The work of making these changes has been completed on 32 cars or 64 motors. The program is being carried out as the cars are brought in regularly on the overhauling schedule and the work will extend over a period of two years. A wonderful improvement in the operation of these motors has been found on the cars already overhauled. Service of this railway is very exacting, but the improved motors have produced a material reduction in field coil and armature troubles.

New Equipment Available

Vapor and Dust Proof Condulets

FOR electrical installation of lighting or other wiring where vapors, fumes, gases or dust are present the Crouse-Hinds Company, Syracuse, N. Y., has just placed on the market a new series of condulets, hand lamps, switches and fuse boxes. These are particularly suited for installation in paint storage, gasoline storage, general oil storage and woodworking plants. Condulets of the V series have hubs cast solid with the body. The globe is threaded and screws into the condulet so as to bottom on a flat gasket. This series provides for installation of screw guards as well as various types of reflector units.

For portable lighting a vapor-proof hand lamp of similar construction is provided. It has a swinging bail, a watertight cord outlet with cord reinforcement to prevent chafing, a key receptacle with lamp grip and a watertight operating handle for the key receptacle. The body is aluminum and the guard, including the base, is brass. The handle is provided with a stuffing box which consists of a gland nut and tapered rubber plug which surrounds the cord, completing the equipment and making the lamp vapor and dust proof.



Vapor and Dust Proof Condulets Used in Lighting Installations. No. 1, Screw Guard; No. 2, Condulet Holophane Reflector; No. 3, Porcelain Reflector Unit; No. 4, Hand Lamp

Power Reamer to Do Work of Old Hand Reamers

WELL adapted for general machine shop use, but particularly valuable for reaming bushings and small compressor crankshaft bearings, a new motor-driven reaming machine has just been placed on the market by the Van Norman Machine Tool Company, Springfield, Mass. The new machine, called "Reamo," is a compact bench type, driven by a Westinghouse motor at a speed of 30 r.p.m. It produces a smooth polished job free from chatter and the work when finished resembles a broached bearing. For ordinary operation the work is held in a natural position at the waistline of the operator so that the reamer enters and follows through one or both bearings in a straight line. The work can then be withdrawn from the reamer while it is still turning, thus leaving no marks on the bushing or bearing. When the reamer has been set for the correct size the bearing can be reamed rapidly. The Reamo takes reamers up to 1½ in. diameter.

Reaming Out a Bushing by Means of the New Power Reamer, "Reamo"

Direct-Current Time Relay

A DEFINITE time relay for operation on direct-current circuits has been designed by the General Electric Company. This is made in two forms, designated as type MC-12, one for 115-volt operation and the other for 230 volts.

The new relay is designed to operate within a range of from five seconds, minimum, to 35 minutes, maximum. An extra lead is brought out through the enclosing case for connecting to the necessary resistor. A resistor mounted inside the case is connected in multiple with the motor armature to give constant speed.

American Association News

Cleveland Exhibit Hall Completed on Schedule and Practically Sold Out

ON FRIDAY, Sept. 3, the immense new building which has been constructed to house a large portion of the exhibits at the American Electric Railway Association convention was completed. The next day, Saturday, it was formally turned over to the Cleveland convention committee. Thus the building was finished in just four weeks from the time the work of clearing the ground was begun.

The progress of construction has been told in a series of pictures published in this paper week by week. On this page the views show not only the appearance of the new building but its relation to the Auditorium and other city buildings. The top view was taken looking east along Lakeside Avenue from the roof of the County Building. In the extreme left is the City Hall and fronting it the Public Auditorium and on the right the newly completed building.

The middle picture is looking north-northwest from the corner of East Sixth and Superior and shows the relative position of the newly completed building and the Public Auditorium. At the right background is the City Hall, fronting Lakeside Avenue and overlooking East Sixth Street. The Public Auditorium is in the center and the new building is at the left. The parked automobiles are in the space that during the convention will be used by car exhibits.

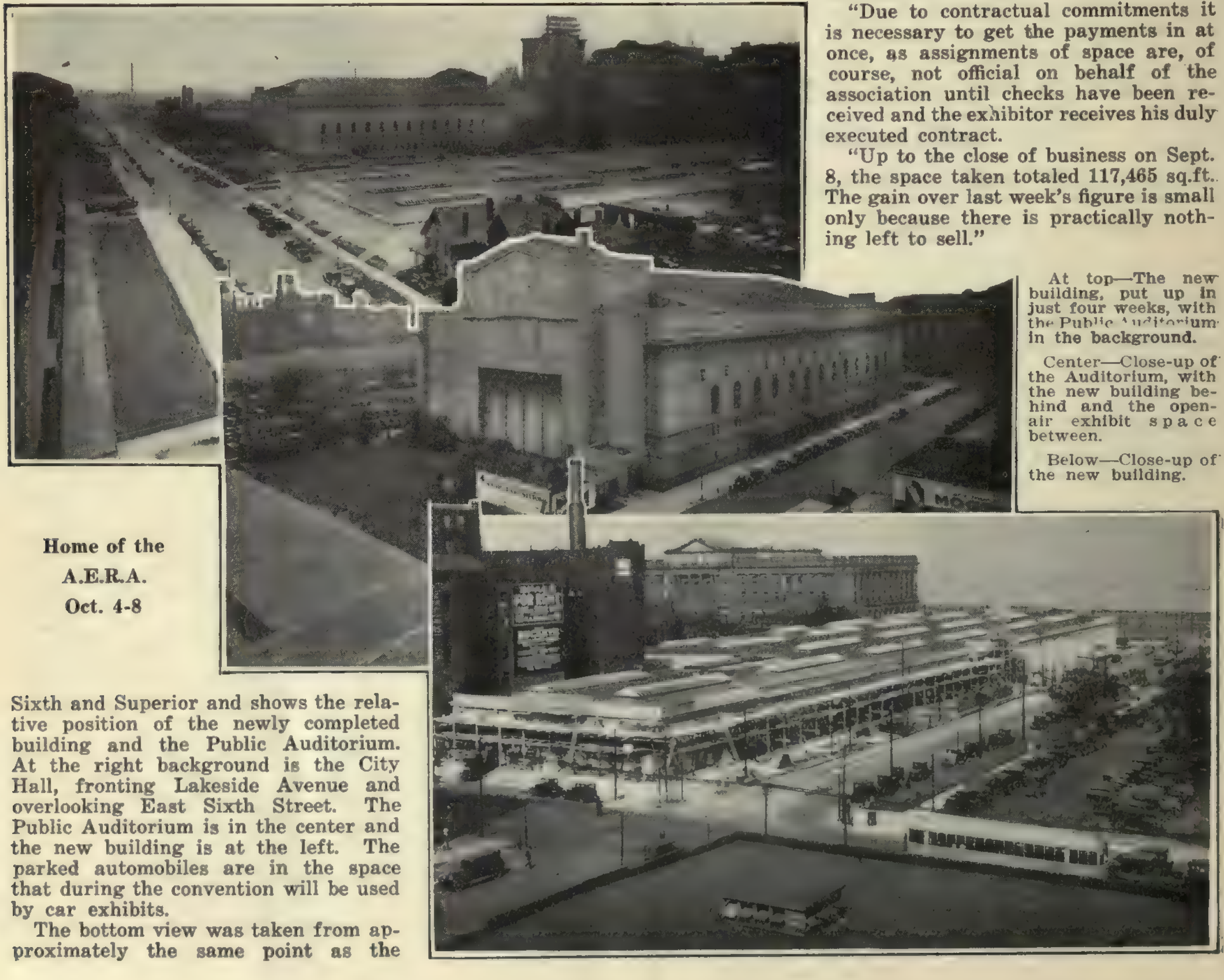
The bottom view was taken from approximately the same point as the previous pictures published of the new Exposition Building. This shows the outside finish (stucco) and skylights being completed. Work on the interior decorations, landscaping at the north end and cleaning off of the contractors' equipment was started immediately after the building was turned over to the committee. The parked automobiles in the right foreground are the same as those seen in the middle view, and likewise show the location of the car exhibits. In the center may be seen the car tracks serving the exhibit and connecting at the upper right of the view with the steam railroads. The large building in the background is the County Building (courts and administration offices).

The speed with which the work has progressed indicates the spirit of the Cleveland Railway management in doing everything possible to make the exhibit a success.

"Only four booths out of the entire space remain to be sold," said Fred C. J. Dell, director of exhibits. "What is still more important, all but sixteen of the exhibitors have paid. This is practically a full month in advance of the convention.

"Due to contractual commitments it is necessary to get the payments in at once, as assignments of space are, of course, not official on behalf of the association until checks have been received and the exhibitor receives his duly executed contract.

"Up to the close of business on Sept. 8, the space taken totaled 117,465 sq.ft. The gain over last week's figure is small only because there is practically nothing left to sell."



Home of the A.E.R.A. Oct. 4-8

At top—The new building, put up in just four weeks, with the Public Auditorium in the background.

Center—Close-up of the Auditorium, with the new building behind and the open-air exhibit space between.

Below—Close-up of the new building.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Sept. 17-18 **— Mid-West Claim Agents Association, sixth annual convention, Elms Hotel, Excelsior Springs, Mo.**

Oct. 4-8 **—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.**

Oct. 10-15 **—Congress International Tramway, Local Railway and Motorbus Association, Barcelona, Spain.**

Oct. 25-29 **—Annual Congress and Exhibit, National Safety Council, Book-Cadillac Hotel, Detroit, Mich.**

Nov. 16-18 **—Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.**

November 16-19 **—American Welding Society, fall meeting and International Welding and Cutting Exposition, Buffalo, New York.**

The News of the Industry

Wages Advanced in Cincinnati

Arbitrators Award Trainmen 2 Cents More an Hour at Cost of $300,000 a Year

An increase in wages that by 1926 will cost the Cincinnati Street Railway, Cincinnati, Ohio, $300,000 a year more than is now paid to workmen was granted to railway employees in an arbitration agreement announced by the arbitration board.

Walter A. Knight, the company's representative, refused to sign on the grounds that the company's expenses already had been increased through rehabilitation work required by the new franchise and also because the general tendency of wages was stationary.

The agreement was signed by James H. Vahey, representing the employees, and by former Judge Joseph W. O'Hara, the impartial member of the board.

The award follows:

Retroactive to July 1, this year, an increase of 1 cent an hour to 54 cents. Oct. 1, 1926, an increase of 2 cents an hour to 56 cents. Jan. 1, 1928, an increase of 2 cents an hour to 58 cents.

CONTRACT TO RUN TWO YEARS

The contract is to expire on July 1, 1928. According to the company an increase of 1 cent an hour means an additional expense of $60,000 a year.

The new agreement is designed to include drivers of the buses operated by the company. The agreement provides that in the event electric railway transportation is discontinued and bus service substituted trainmen shall be given preference as drivers for the buses.

Both Mr. Vahey and Mr. Knight issued statements explaining their attitudes in the matter. Mr. Knight's statement follows:

> As I cannot join in the award I desire to explain why.
>
> The complicated corporate relations have been unscrambled and the city is now dealing with the owning company which operates the property.
>
> The service-at-cost franchise granted the Cincinnati Street Railway effective on Nov. 1, 1925, reduced the dividends of stockholders from 6 per cent to 5 per cent for the first three years, and furthermore has improved its service materially.
>
> Two crosstown lines and feeder lines of motor coaches have been put on by the company to supplement the street cars and round out the service.
>
> All this tends to insure to users of public urban transportation safe, comfortable, convenient and rapid service and is sound business policy for it accommodates the public and because of the increased attractiveness of the service causes more people to ride.
>
> But such service is expensive to furnish and can come only from the receipts from fares. If it is humanly possible to avoid it the rate of fare must not be increased and car riders hope the time will come when some decrease can be made.
>
> At this time the cost of living in Cincinnati is declining a little and the tendency for the next year or so seems to be in that direction.
>
> Wages are not generally increasing; in fact, are generally stationary with a slight tendency downward.
>
> Considering all these conditions and, having the public's interest in mind, as it seems to me an arbitrator should in such a case as this, I am compelled to conclude that this is a time for conservatism, and that the two arbitrators who make this award to the motormen, conductors and carhouse men have gone too far. Giving away other people's money, especially when many will be benefited, may bring a pleasant thrill with it, but this does not justify awards that are economically unsound and hazardous, as I believe this one to be.
>
> It is possible that the excess may be made up by new economies in the management of the property, by such additional and uniform courtesy to the public on the part of motormen and conductors as will attract more people to use the service offered, and by increased efficiency of employees generally. I am satisfied that nothing else can do it, and I hope that every effort will be made to bridge the gap in these ways.
>
> It is with deep regret that I find myself unable to join in the award.

The new two-year agreement will take the place of the last two-year agreement, which ended July 1, 1926.

Improvement Planned at Holyoke

President Pellissier of the Holyoke Street Railway, Holyoke, Mass., has announced that plans are under way for extensive improvements to the lines in Amherst and from the Center to Northampton. The company recently abandoned that section of its lines from Sunderland to North Amherst, which has never been operated at a profit. Service in the abandoned section will be provided by George Fisher, South Deerfield, who has been authorized to extend his bus line to Amherst Center. Mr. Fisher is restricted and cannot take passengers on between Amherst and the bridge near the Sunderland line.

Improvements Promised on West Virginia Line

The West Virginia Utilities Company, Wheeling, W. Va., plans to consolidate the two traction lines it owns in Morgantown and to operate them as one unit with improved equipment and a service schedule doubling the number of cars used and halving the time between cars, according to O. L. Eaton, Jr., commercial manager of the company. Three new cars are being constructed for use in Morgantown. They will be on exhibition at the convention of the American Electric Railway Association in Cleveland. These cars are part of a consignment purchased by the company for use on its Wheeling and Morgantown traction units. Mr. Eaton states that the South Morgantown trackage, recently acquired by his company to be joined to its Sabraton line, will be improved and the entire line, comprising about 5 miles of track, will be placed in first-class condition.

Consolidation with Service at Cost in Chicago

City Plans to Appoint Committee to Collaborate with Companies in Working Out New Plans

For the first time since the negotiations began for a new traction ordinance in Chicago the city, representatives of the companies and bankers are unanimously agreed that the local transportation properties should be consolidated.

Whether an ordinance should be granted to a single corporation for the operation of all forms of local transportation, including surface, elevated, subway and motor bus lines, or whether the surface and elevated lines alone should be merged has not been definitely decided, but the general policy of consolidation is no longer a stumbling block in the way of traction progress.

The settlement of this important point was the feature of a meeting held in Chicago on Sept. 1, the second of a series of conferences to work out a solution of the city's perplexing transit problems. At the instance of the bankers, the city was authorized to appoint a committee to collaborate with the companies in working out the details of such a plan.

It was further agreed at the meeting that the type of grant to the proposed company should be an indeterminate permit. Although the traction officials have long been advocating a grant of this kind from the state, no opposition was expressed when the Aldermen proposed to have the franchise issued by the city. Their silence was taken to mean that they assented. The question of whether the city or the state shall exercise control over the consolidated properties was purposely left open for the time being.

Barring more or less determined opposition on the part of the bankers and company representatives to the Aldermen's notions about amortization and city compensation, the general proposition that the new ordinance should be based on service at cost, with a reasonable return on the investment, and not a fixed rate, was likewise concurred in. Such service at cost would necessarily include, it was pointed out, expenses of operation with adequate provision for damage, depreciation and renewal reserve funds.

The bankers and company officials, however, strongly urged an amortization fund to reduce the capital investment on the grounds that it would establish good credit, make available all the money needed for extensions and at the same time enable the company to maintain a reasonable fare.

Frank O. Wetmore, chairman of the First National Bank, voiced the conviction of the majority of traction representatives in asserting that the city's compensation—55 per cent of net receipts—should be eliminated. By putting the surplus back into the properties, he contended, the city could, if it wished at some time to purchase, buy the properties at much lower cost than if it accumulated a traction fund, similar to the present $45,000,000 account, which draws only from 2 to 2½ per cent interest. City compensation is a charge against the car rider, Mr. Wetmore added, for which he receives no immediate benefit.

Short Shrift Made of Carhouse Bandits

Salvatore Merro and Salvatore Rannelli will pay—Merro with his life and Rannelli by life imprisonment, for the murder of Theodore M. Conway, paymaster of the Public Service Corporation of New Jersey, Newark, N. J., killed by bandits in a raid on the Central Avenue carhouse on June 4. Neither of the prisoners was actually seen in the act of shooting the paymaster nor in the carhouse, but more witnesses positively identified Merro than Rannelli as having been seen in a gun battle running from the scene of the attempted hold-up. The case was tried before Judge Van Riper in the Court of Oyer and Terminer. The jury deliberated 4½ hours before returning its verdict of guilty of first degree murder against both defendents, adding a recommendation for life imprisonment for Rannelli.

Summing up the state's case, Prosecutor Biglow praised the state witnesses, who, he said, rushed to the aid of the law at the time of the outrage and, further, came to court to see that justice was done, thereby doing their part toward stamping out the epidemic of murder and robbery.

Mrs. Conway, widow of the murdered paymaster, has been provided for by the welfare department of the Public Service Corporation. She will receive the full amount of her husband's pay until June 30, 1927, and thereafter one-half his yearly salary for twelve years, by which time her children will probably be self-supporting.

Island Ferries to Go to Toronto Transportation Commission

It appears that another activity is to be added to the operations of the Toronto Transportation Commission, Toronto, Ont. That body is about to take over and operate the ferryboats across the bay. The stage is all set for this, and the board of control has requested the ferry company to give the commission access to all books and other documents. Mayor Foster is quoted as follows:

> As we will not be taking over until the end of the season, it will be next year before the T.T.C. would have to operate the ferries, and the question of fares or change in the staffs operating the ferries would not come up until then. Of course, after the regular season closes, about the end of October, I suppose either the city or the T.T.C. will operate an abbreviated service for the convenience of Island residents for a few weeks, as Mr. Solman has done in past years.

Paving Relief Approved

Pennsylvania Commission in Agreement with New Arrangement Made at Williamsport

Another name has been added to the long list of electric railways that have received relief from burdensome paving requirements. The company is the Williamsport Passenger Railway, Williamsport, Pa. The case was passed upon some time ago by the Public Service Commission of Pennsylvania, but the full text of the finding has only recently become available. The commission says that the proceeding involving the operation of the railway in Williamsport came before it under unusual and exceptional circumstances. It held in substance that the modification by the city of the street railway paving obligation previously imposed was in line with modern thought on the subject and in conformity with the expressed opinion of the commission.

Some time ago the electric and railway systems operating in Williamsport were sold to the Lehigh Power Securities Corporation. The new management advised the City Council that it would require an expenditure of $300,000 to place the system in proper condition; that under the present rate of fare of 5 cents and the street paving burdens imposed under the existing ordinances it was impossible to raise the money for the improvements. The Council, by resolution, authorized the Mayor to appoint a committee to investigate the matter and make definite recommendations. This committee filed its report on Nov. 6, 1925. This report discussed in detail the history of the street railway system in Williamsport. On Dec. 15, 1925, the report was finally adopted by the Council, including specific recommendations covering additional equipment and facilities, suggested rate of fare, increase of employees' wages, rerouting, and modification of paving obligations.

As a preliminary step to carry the report into effect the Council on Dec. 30, 1925, enacted an ordinance to authorize and empower Lewis W. Heath, as trustee for the Williamsport Passenger Railway, Vallamont Traction Company, East End Passenger Railway and South Side Passenger Railway, and as trustee for Williamsport Railways (to be formed by the merger and consolidation of the four first-mentioned companies), to maintain a railway upon certain streets in Williamsport, then occupied by the four railway companies. The ordinance repealed on the date it becomes effective all existing ordinances granting franchises to the then operating companies.

The commission in this case did not pass upon or fix any value of the property and franchises of the companies nor any rate of fare. The only question before it was whether the terms and conditions of the ordinance of Dec. 30, 1925, were reasonable and the approval of the ordinance contract necessary or proper for the service, accommodation, convenience and safety of the public. It points out that the ordinance does not become effective until a new corporation is legally created by the consolidation and merger of the existing railways in the city. Before the charter can issue to the new corporation the commission must approve the terms and conditions of the consolidation and merger. Any or all questions with respect to capitalization of the new corporation can be raised in the subsequent proceeding before the commission. The proceeding does, however, change and modify the existing obligation resting upon the companies for street paving. In this connection the commission says:

> Under the laws of Pennsylvania, street railways must look to the municipalities which granted the franchises for any relief from such obligation. The Appellate Courts of Pennsylvania have held that this commission has no jurisdiction to vary the franchise ordinance imposing upon a street railway the obligation to pave or keep in repair the streets upon which its tracks are located. (Swarthmore Borough vs. Public Service Commission, 80 Superior Court 59; 277 Pa. 472.)
>
> In a former proceeding, Borough of Swarthmore vs. Philadelphia, Morton & Swarthmore Street Railway, and Philadelphia Rapid Transit Company (Complaint Docket No. 3579) Volume V, Decisions of Public Service Commission, pp. 438 and 446, in which the question of street paving was involved we said:
>
> "It is a matter of common observation that the street railways of the country have been forced to meet a considerable diminution in street passenger traffic. This has been caused in large part by the use of privately owned automobiles. It is manifest, therefore, that street railways should not continue to be burdened with obligations beyond that which is directly involved in the service which they are called upon to render and reasonable for them to bear in connection with the maintenance of state and municipal governments under whose authority they are authorized to render service.
>
> "The Federal Electric Railways Commission, called together to study the street railway situation of the country, in reporting to the President of the United States, after extended hearings, recommended: 'Effective public co-operation should be exercised by eliminating, in so far as it is practicable, special assessments for sprinkling, paving, and for the construction and maintenance of bridges, which are used by the public for highway purposes.' "
>
> The modification by the city of Williamsport of the street paving obligation now imposed on certain of the companies operating street railways in the city is, therefore, in line with the modern thought on the subject and in conformity with the expressed policy of the commission.
>
> One of the operating companies—Williamsport Passenger Railway Company—is incorporated under the special act of Assembly approved April 16, 1863 (Pamphlet Laws of 1864, page 1080) and is not required to obtain a franchise from the city or contribute any moneys toward the paving or repaving of the streets occupied by its tracks. This company owns and operates more than one-half of the trackage in the city. Before the company can merge with the other companies operating in Williamsport, it must accept the provisions of the street railway act of 1889, and subject itself to the requirements of said act and relinquish the special provisions it now possesses under its charter. It would be unjust and unreasonable to require this company, after the merger, to assume a street paving burden and obligation which it is not now required to bear.
>
> We have given careful consideration to all the provisions of the ordinance submitted for approval and find nothing therein which in our opinion is inimical to the interests of the public.
>
> In conformity with the above, we find and determine that the approval of the aforesaid ordinance contract is necessary and proper for the service, accommodation, convenience and safety of the public.

More Skip Stops in Baltimore

The United Railways & Electric Company, Baltimore, Md., has notified the Maryland Public Service Commission that it will start the skip-stop system on six additional lines in the city. The plan is to be effective only between 6 and 9 a.m. and 4 and 7 p.m.

Formal Order in Milwaukee One-Man Case

The Railroad Commission of Wisconsin has issued its formal order authorizing the Milwaukee Electric Railway & Light Company to operate one-man cars on its Wells-Downer line. The operation of two-man cars will be continued on this line, but the company offers to provide the extra service recommended in the commission's report on railway service in Milwaukee by the partial use of the one-man car.

The investigation which the commission conducted last spring following complaints by the public showed a deficiency of service on many lines. Recommendations consequently were made by the commission in its report urging the purchase of 75 additional cars, increased service on a number of lines, track extension of certain lines and other improvements.

In its report the commission recommended the purchase of 75 new cars to improve service, but the commission in its latest order cut the number down to 40 cars. The order provided, however, that 95 per cent of these cars are to be available for service during the winter months.

Engineers of the commission also recommended the double tracking of the Oakland-Delaware line north of the Atwater road, extension of the Eighth Street line to Lake Street on the north and extension of the Mitchell Street line two blocks beyond the Northwestern tracks on Forest Home Avenue, on which work has already been started. The engineers also recommend that if the Pabst-Wauwatosa line is to be maintained it should be double tracked as far west as Third Avenue in Wauwatosa. If, however, the Vliet Street and North Avenue lines are to be extended in the future, the Pabst-Wauwatosa line west of 60th Street could be discontinued.

A House-to-House Canvass in Chicago

Much success has attended a service improvement campaign being conducted by the Chicago Rapid Transit Company, operating the elevated lines in that city, among the employees who come into direct contact with the public. As a first step in the campaign an accurate survey was made of the public attitude toward the railway company.

A staff of trained men and women was sent into homes in the evening to ask the people questions regarding "L" service. Many people were interviewed and their answers to the questions asked were carefully analyzed. It was found that 61 per cent were favorable toward the company, 21 per cent were indifferent, 9 per cent very friendly, 7 per cent unfavorable and 1 per cent hostile. The reasons given for the attitude toward the company were carefully studied and it was found that the biggest factor was the personal service of the individual employees. The least important factor was the rate of fare.

With the information obtained from this survey and analysis of the public reaction toward the company, the campaign was started among the employees. The idea is to get the employees thinking of their work and how they can best please the patrons of the company. When the matter was explained to the employees they showed a fine spirit of co-operation.

Forty Years of Faithful Service

William S. Fisher, motorman with the Concord Electric Railway, Concord, N. H., completed his fortieth year of service on Aug. 17. Mr. Fisher would be an asset to any company on account of his loyalty, carefulness and the deep interest he takes in the company for which he works. He has seen the change from horse cars to narrow gage steam, then to electric power on the same gage, and finally from the 3 ft. to the standard gage of 4 ft. 8½ in. At the time that he entered the service, horse cars were run from Fosterville to Allison Street, while steam motors or steam "dummies" were run from Fosterville to the northern terminal at Penacook. About four years later the electric railway was instituted. Mr. Fisher worked for six years as a fireman on the Boston & Maine Railroad previously to his employment with the electric road.

Chicago Bank Favors Terminable Permit and Service at Cost

A terminable permit and service at cost—two of the outstanding features of the Chicago traction ordinance now pending before the local transportation committee of the City Council—are indorsed as sound principles in a bulletin recently issued by the Northern Trust Company, Chicago.

"Regardless of the chances for final adoption of the ordinance," the bulletin reads, "its framers are entitled to gratitude for bringing before the citizens of Chicago the principles of a terminable permit of the right sort, and service at cost."

The so-called barometer rate of fare, or service at cost, it points out, has been found successful in other cities. It allows a fair rate of return on investments under all conditions, even when earnings are diminished.

Showing the advantages of the terminable permit, the bulletin explains that street railway franchises under the Illinois state law are now limited to twenty years. As a result, near the close of the franchise, a company is uncertain as to its future, and both its service and profits deteriorate.

"Under the present law," the bulletin continues, "it appears impossible to frame a franchise under which refunding of the $162,000,000 in Chicago street railway bonds now outstanding can be accomplished."

Traction officials have declared flatly that they will not negotiate on the basis of the ordinance as now drawn, but Corporation Counsel Francis X. Busch, the author of the draft, believes that at least the principles may be retained if other independent financial interests take the same attitude as the Northern Trust Company in that the attraction of capital is admittedly the vital problem in any agreement.

Transportation Business Increases in St. Louis

Col. Albert T. Perkins, general manager for Receiver Rolla Wells of the United Railways, St. Louis, Mo., in commenting on the improved conditions on the street cars expressed the belief that the gain in revenue passengers for the six months ended June 30 compared with the same period in 1925 was due in large measure to several large conventions and public gatherings held in St. Louis this year. These included the Grotto convention, centennary of the St. Louis Archdiocese and dedication of St. Louis Cathedral and the Lutheran convention and dedication of Concordia Seminary.

The total number of passengers carried by the United Railways for the six months ended June 30 was 135,460,138, compared with 135,093,695 in the similar period of 1925. However, this year was far behind the total for the six months of 1923, the company's banner year. In that year the first six months registered 137,651,059 passengers.

The St. Louis Bus Company, which exchanges transfers with the railway, in the six months ended June 30 carried 2,217,115 passengers, compared with 881,598 the first six months of 1925. On the last day of June last year this company had twenty buses in regular service. At present it is operating 28 buses. However, in the early months of 1925 the company's lines were not fully organized and for that reason the large increase in traffic shown is somewhat abnormal, but its business has been growing steadily on all its lines.

Fare Continuance Authorized on New York & Stamford Road

The Public Service Commission of New York on Sept. 1, by formal order, authorized the New York & Stamford Railway, Portchester, N. Y., to continue in force until July 1, 1927, the passenger fares in effect prior to July 1, 1926, on its lines within the State of New York and within the zones prescribed as follows:

Zone No. 1—Between Mechanic Street, New Rochelle, and dividing line, 1.5 miles, a fare of 5 cents with free transfer privilege to and from lines of the Westchester Electric Railroad in New Rochelle.

Zone No. 2—Between Dean Place and westerly boundary of Larchmont, 2.2 miles, with lap zone extending east to Delancey Street, Mamaroneck, a fare of 7 cents with free transfer privilege to and from cars of Larchmont Manor line. The Larchmont Manor line, extending from the New Haven Railroad station and the terminus of line at Larchmont Manor, village of Larchmont, a distance of 1.49 miles, is included in zone 2, with fare of 7 cents and free transfer privileges between main points in village of Larchmont only.

Zone No. 3—Between westerly boundary of village of Mamaroneck and the Mamaroneck-Harrison town line, 1.9 miles, with lap zone extending west to Beaver Street, town of Mamaroneck, fare of 7 cents.

Zone No. 4—Between westerly boundary of town of Harrison and North Street in village of Rye, about 1.8 miles, fare of 7 cents.

Zone No. 5—Between North Street, Rye and Liberty Square, Port Chester, 2.61 miles, with lap zone extending to Mill and Main Streets, Port Chester, fare 7 cents with free transfer privileges to and from Rye Beach-Rye station line and the Rye Beach-Port Chester line.

Zone No. 6—Between Liberty Square.

Port Chester, and Railroad and Greenwich Avenues, Greenwich, Conn,, about 3.12 miles, with lap zone extending westerly to town hall, Greenwich, and easterly to New York & Stamford Railroad's carhouse in Port Chester, 7 cents.

Special tickets or books containing 28 tickets will be sold for $1 to pupils under eighteen years old attending school. Each ticket is good for one ride between any two points within any zone except between Dean Place and Mechanic Street, New Rochelle.

Passengers boarding cars in the village of Port Chester are entitled to free transfer within the village of Port Chester only.

Passengers boarding cars in zones 5 and 6, outside Port Chester, are entitled to transfer to local line within Port Chester for 3 cents for transfer. Passengers boarding cars of local line in Port Chester are entitled to transfers to points in zones 5 and 6 outside of Port Chester, including Rye Beach line, upon payment of 3 cents for transfer.

The village of Mamaroneck waived the provisions of the franchise restricting fares within the village of Mamaroneck zone.

The schedule is of interest because it represents an agreement largely mutual, arranged on a basis believed to be all that the traffic will bear.

Elevated Tramway Proposed for Montreal

Particulars were disclosed at a recent meeting of the City Council of Montreal, Que., of the main plans for an elevated high-speed tramway line north from Place d'Armes. By the proposed system, cars would be able to reach Mount Royal Avenue from St. James Street in five minutes, according to an authoritative opinion, compared with the present rate of twenty minutes by the surface lines. These plans, it was stated, have been prepared for three or four years by the Montreal Tramways and the Montreal Tramways Commission. St. Urbain Street is considered the logical route for the proposed elevated line. The change would necessitate widening from about 30 ft. to 80 ft. from Craig to St. Catherine. Plans call for elevated tracks on St. Urbain Street from Craig Street to a little above Ontario Street. At this point the tracks would go underground, below Sherbrooke Street, and come out on the surface again at Milton Street. From there north surface lines would be followed. By laying the elevated line made in this way grade crossings at the congested intersections would be avoided. Beyond Milton Street, St. Urbain is considered wide enough for the surface lines.

Provision is made for one stop only between Craig Street and the reaching of the street surface at Milton Street. This is at St. Catherine Street. Steps would lead up to the elevated lines from that thoroughfare.

Provision is also made for a convenient entrance to the terminus of the elevated lines at Craig Street extending to St. James Street, where passengers could step off the street into the passageway to the landing platforms.

With an 80-ft. street there would be room for parking cars and traffic in both north and south directions.

Consideration has been given to providing better transit north from Place d'Armes, because that is the most congested area.

Final Eucharistic Congress Facts

Further Particulars Are Given About Passenger Movement Over Rapid Transit and North Shore Lines

The International Eucharistic Congress of Chicago, Ill., is now largely a memory, but interest still attaches to the final transportation figures, unavailable heretofore because of the vastness of the whole undertaking and the difficulty experienced in keeping a comprehensive check of the number of tickets sold and cars operated. In the archives of the electric railway industry will repose the record of this stupendous achievement in mass transportation by the Chicago Rapid Transit and Chicago, North Shore & Milwaukee lines, which last June hauled more than 225,000 pilgrims to the scene of the closing ceremonies at Mundelein.

Some amazing disclosures of the Mundelein trek follow: Four hundred and forty-five special trains, composed of 2,785 cars, operated into a six-track terminal in a single day! Three hundred and twenty rapid transit trains of six cars each operated from Chicago over the elevated tracks to Howard Street and thence over the Skokie Valley route of the North Shore line directly to Mundelein, 40 miles away. Ninety trains of eight cars each were operated in shuttle service over the 13-mile branch of the North Shore Line from Lake Bluff to Mundelein. From Milwaukee, Racine and Kenosha, Wis., 35 special trains, composed of 177 cars, were run by the North Shore Line during the morning of the great Catholic pilgrimage.

THURSDAY THE BIG DAY

For the suburban roads the big day was Thursday, June 24, when the congress moved to Mundelein, Ill. It is estimated the attendance at Mundelein that day was more than 400,000. Details of the passenger movement on June 24 supplementing those contained in the account published in the ELECTRIC RAILWAY JOURNAL for July 3 follow:

> Nearly 250,000 were transported over the combined Chicago Rapid Transit and North Shore Line to Mundelein and return.
>
> Approximately 170,000 were carried by the Chicago Rapid Transit from Chicago, 45,000 via shuttle train from the Lake Bluff station of the Northwestern steam road and approximately 30,000 from North Shore line points in Wisconsin, making a total traffic over the joint electric lines of roughly 250,000.
>
> Combined facilities of the three steam roads accommodated only about 85,000.
>
> About 340,000, or 80 per cent of the great throng, were transported by rail. The rest went by automobile.
>
> The total number of Rapid Transit cars in the Mundelein service was 932.
>
> A total of 372 trains was operated by the Rapid Transit and North Shore Line.
>
> The number of pilgrims transferring from the Northwestern steam road and from North Shore Line points at Lake Bluff is estimated at 75,000.
>
> There were approximately 1,000 cases of fatigue and heat prostration during the day at Mundelein, several minor injuries incurred in the crowd that jammed the stockade outside the terminal, but not an accident occurred which could be laid to the Rapid Transit or North Shore Line.

In addition to the six-tracked terminal at Mundelein, three temporary substations were installed on the Libertyville branch to meet the extraordinary power demand. Overhead trolley equipment was placed on 125 motor cars of the Metropolitan division of the Rapid Transit lines, which normally operate on third-rail only. Arrangements were made to short circuit a part of the resistance in the headlight circuit of the elevated cars and to install special lamps to provide for the extra candlepower needed for operating in the country. Emergency crews from all maintenance departments and first aid teams were located at strategic points along the right-of-way. All available employees were drafted by the transportation department for train and platform service, and in addition a large number of employees of the Commonwealth Edison Company and of the Public Service Company of Northern Illinois were used for transportation service. Means were taken to reduce as much as possible the chance of danger due to the inexperience of these men. The car switches for changing from overhead trolley to third rail were closed with busbars, keeping both the overhead trolleys and third rail shoes alive, so that the trainmen did not have to manipulate the dangerous knife switches. At the points where the change from overhead trolley to third rail and vice versa was made, the trains were stopped and men stationed on the ground saw that everything was in readiness for going ahead.

A fare of $1.50 was charged for the round trip of about 80 miles. To avoid confusion and save time, fares were collected at the Mundelein enclosure on the pay-leave system outbound and on the pay-enter system inbound. An advance ticket sale was started some time before Thursday, first in the different parishes, and then at "L" stations and other convenient points.

The two companies went to great length to safeguard their patrons. Practically all injuries experienced by the visitors were due to crowding at the gates of the terminal, once when a deluge of rain and hail fell during the program, and again at the close of the ceremonies. Employees worked heroically to keep the crowds in order, and a large medical force, under the direction of Dr. Hart E. Fisher, chief surgeon, treated the injured. Two hospital cars were on hand, one at Mundelein and the other at Lake Bluff. The car at Lake Bluff was transferred to Mundelein when the rush for home began.

The problems of the Chicago Surface Lines were of a different character, but no less exacting than were those of the "L" and the North Shore. The record of the Surface Lines was equally impressive. It has been given quite fully before. The city's experience with traffic during the Eucharistic Congress last June, when a rigid ban was placed on parking in all loop streets for three days, was so satisfactory that a resolution establishing a permanent no-parking rule for the downtown district has been introduced in the City Council.

There were close to 1,000,000 visitors in the city, but downtown traffic was less congested during the great religious conclave than it has been for years. Reports from official observers indicated that the greatly augmented traffic moved with more swiftness than that attained by the ordinary business day's traffic. The no-parking rule had the effect of doubling the width of the downtown streets. In spite of the heavier riding, the speed of Surface Lines cars through the Loop was much greater than usual.

Chicago Elevated Wage Controversy Is Settled

The wage controversy between the Chicago Rapid Transit Company and 4,500 of its trainmen, begun on June 1 when the last agreement expired, has been effectively settled by compromise between the two parties.

Under the terms of the arbitrators' award, which was made on Sept. 4, the company will pay the entire cost of maintaining a $20 a week sick benefit for all employees in service one year or more and a $1,000 death benefit for all employees in the service of the company three months or longer. Heretofore the men have contributed three-fifths of the cost of maintaining these welfare features and the company two-fifths.

Miniature of Sign Displayed in Street Cars by Philadelphia Rapid Transit Company

B. J. Fallon, vice-president of the company, and Maclay Hoyne, representative of the union, who composed the board of mediation, denied the trainmen's demand for an increase of 5 cents an hour over the present 77 cents paid motormen and the 72 cents paid conductors.

Had the demands for increased wages been granted, rapid transit officials say, the annual payroll of the company would have been increased by more than $700,000.

The new agreement is retroactive to Sept. 1. It will run until May 31, 1927.

Wages Fixed in Birmingham

The Birmingham Electric Company, Birmingham, Ala., and its union conductors and motormen compromised on Sept. 7 on a top wage of 54 cents an hour, thus averting a strike which had loomed for a week. More than 800 men are affected, with a cost to the company of $125,000 a year.

The amicable settlement was brought about by the City Commission intervening as arbitrator when railway officials and men were deadlocked. Just before the compromise the men voted to strike. The railway had offered 52 cents, but the men had demanded 57½ cents. The old top wage was 50 cents. The new contract terminates on Sept. 1, 1929. It calls for 44 cents for the first year of service, 49 cents for the second year and 54 cents for the third year. The agreement also includes a 2-cent increase for other railway employees.

Street Car Company Has Air Service to Norfolk, Va.

On Sept. 13 the air service of the Philadelphia Rapid Transit Company, Philadelphia, Pa., will be extended to Norfolk, Va. Chairman T. E. Mitten announced during his address to the eighth annual meeting of employee and employer committeemen at Willow Grove Park, Philadelphia, on Sept. 1, that this step would be taken. The extension in daily service is another step in Mr. Mitten's demonstration of the possibilities of commercial aviation in this country. Heretofore the service has been available only between Philadelphia and Washington, but with the delivery of a third triple-motor Fokker plane the plan is being made more comprehensive. Possibly before the close of the Sesqui-Centennial exposition another step will be taken in providing passenger air service from New Brunswick, N. J., to Philadelphia, Washington and Norfolk. This would be the nearest available landing field in the vicinity of New York City.

Chairman Mitten explained the venture of the Philadelphia Rapid Transit Company into commercial aviation as an effort to demonstrate that such a service has real possibilities in this country. In spite of the proud boast of Americans that commercial flying is further advanced here than elsewhere in the world, Mr. Mitten pointed out that prior to the establishment of the P.R.T. air service as a feature of the Sesqui-Centennial practically all that the country had in this direction was "hoptoads at $5 a hop."

While the P.R.T. air service will cease with the close of the Sesqui-Centennial, Mr. Mitten announced himself as willing to aid in the formation of an American Air Service Corporation to carry on the establishment of routes throughout the entire country. This could only be done, however, provided the government is sufficiently appreciative of the value of such an undertaking to back the venture with its resources. The Philadelphia Rapid Transit Company will go out of the aviation business, but it will have served a real purpose in demonstrating the fundamental possibilities of this line of endeavor.

Some Recent Wage Settlements

The United Electric Railways, Providence, R. I., has settled with its employees on a new wage scale effective for one year from June 1, 1926. Motormen, conductors and one-man car operators have been granted an increase of 1 cent an hour. Bus operators, who formerly received the same rate as motormen and conductors on two-man cars, namely, 61 cents an hour, have been granted the same rate as one-man car operators, 68 cents an hour.

The wage rates for trainmen of the Macon Railway & Light Company, Macon, Ga., have been renewed for one year from Aug. 1, 1926.

The wage rates for trainmen of the Oklahoma Union Railway, Tulsa, Okla., which expired July 15, 1926, have been continued in effect, without change.

The agreement between the Great Falls Street Railway, Great Falls, Mont., and its employees, which expired Aug. 15, 1926, has been renewed for one year without change.

The contract between the Joplin & Pittsburg Railway, Pittsburg, Kan., and its employees, which expired Aug. 1, 1926, has been continued for an indefinite period by mutual consent.

The wage rates for trainmen of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, have been renewed for one year from Aug. 16, 1926.

Crash on Detroit United Causes Ten Deaths

Ten deaths and the injury of 30 other passengers resulted from the head-on crash of two Detroit United interurban cars while traveling at high speed on a curve near Monroe, Mich., on Sept. 2.

According to a statement by the general manager of the Detroit United Lines, the conductor of the southbound car has admitted that orders to await a second car at a siding were forgotten. The motorman is in the Monroe Hospital seriously injured. Both the conductor and motorman had been instructed at Rockwood, Mich., to await two cars on Pine siding, 3 miles north of Newport, according to the statement attributed to the D.U.R. official, but they awaited only the first, a local car, and then continued on, forgetting that the northbound Toledo-Detroit express was approaching. A report of the accident gave the speed of each car at about 45 m.p.h. They met in the middle of a 2,000-ft. curve, and because of trees and telegraph poles which obscured the view neither motorman could see the other car approaching. In the collision one car ripped loose from its trucks and rode over the other, crashing through the vestibule and into the smoker. Six of the passengers killed were taken from the smoker of the southbound car.

Separate investigations are being conducted by the D.U.R. officials and authorities of Monroe County, in which the wreck occurred. Both motormen on the wrecked cars are reported to have had fine records. One was considered one of the oldest and most trusted employees of the division.

Offers Made to Co-operate in Whitestone Operation

Willingness of the Brooklyn-Manhattan Transit Corporation to operate the Whitestone branch of the Long Island Railroad, if the city acquires it, was announced by Borough President Maurice E. Connolly of Queens in an interview on Sept. 3. Mr. Connolly said that William S. Menden, president of the B.-M. T., had assured him that the company would operate the branch as a part of its Queensboro rapid transit line without an additional fare.

The Long Island Railroad has offered to give the city its Whitestone branch, together with twenty acres of shore property, in order to be relieved of half the expense of the elimination of its grade crossings, the total cost of which is estimated at $4,000,000. Under the terms of the offer the railroad right-of-way may be used for rapid transit purposes or for a highway. The company's contention is that the branch is unprofitable and that the company cannot afford to pay half the cost of the proposed elimination of grade crossings. This offer is pending before the Board of Estimate, and Mr. Connolly is expected to move for its consideration at an early meeting.

At the B.-M. T. offices it was stated that Mr. Menden at his conference with Mr. Connolly had assured the Borough President that the B.-M. T. was "ready and willing to co-operate with the city authorities in extending rapid transit service in Queens."

Another Dorchester Transit Award Announced

The C. & R. Construction Company is the lowest bidder and undoubtedly will receive the contract to build the third section of the Dorchester rapid transit system, to be operated by the Boston Elevated Railway. The bid was $626,550 and the nearest competitor for the contract was the J. C. Coleman Sons Company, bidding $650,695. There were eleven bidders and the highest bid was $1.069,400.

This section covers about 1 mile between Geneva Avenue and Peabody Square and will include the construction of the Shawmut station and the rebuilding of Peabody Square bridge. With the awarding of this contract more than one-half of the 6-mile extension will be under construction. The New Haven Railroad has discontinued its service to four stations and permanently abandoned the location to clear the way for the rapid transit electric railway construction work.

One-Man Cars on Two More Buffalo Lines

One-man cars have been placed on two more local lines in Buffalo, N. Y., by the International Railway. Similar cars are now in operation on almost every line in the city. Additional cars have been placed on all routes where one-man operation is in effect, thus reducing the headway between cars. Cars which have been rebuilt for one-man operation have been equipped with all of the latest safety devices.

B. J. Yungbluth, president of the International Railway, announces that one-man car operation has enabled the company to increase service and at the same time reduce accidents more than 16 per cent in a two-year period. Mr. Yungbluth explains that, despite the opposition to the one-man car service in Buffalo, the company has found that this form of transportation has proved of benefit to car riders and the management because no attempt would be made to increase the number of one-man car lines if it was found that accidents were increased, for Mr. Yungbluth says accidents are the most costly by-product of transportation.

A change announced by the company on all one-man cars allows passengers going toward the business section of the city to pay as they board and to pay as they leave on the outbound trip.

Albany Fare Case Reopened

The Public Service Commission has fixed Sept. 30, at Albany, N. Y., as the time for the hearing of the petition of the United Traction Company for a determination that increased passenger fares may be charged in various municipalities and that new fares may be put in effect on short notice. At the same time the complaint of the city of Albany against the United Traction Company asking for a reduction of fares will be heard.

This reopening of the fare case is the next step in the application of the United Traction Company for an increase in its fares in the Capitol district from 7 cents to 10 cents. On Aug. 18 the Public Service Commission decided that the Legislature had taken away its power to regulate fares as against local franchise fare restrictions in the cities of Troy and Rensselaer. This left the company in the position of being able to petition for an increased fare on such of its lines as are located outside the cities of Troy and Rensselaer only.

Urge for Rapid Transit Line Felt in Seattle

Spurred into activity by a report by the City Planning Commission urging construction of subways and elevated tracks for a rapid transit system, the utilities committee of the City Council recently took up the matter of creating a rapid transit line along Westlake Avenue from Virginia Street to Fremont, rebuilding the roadbed and replacing the present rails with heavier ones.

D. W. Henderson, superintendent of the municipal railway system, said for three years the required rails have been at the Georgetown station, but that he has been unable to obtain the $62,000 necessary to pay for the cost of laying.

It is proposed that the project be financed by the issuance of interest-drawing warrants, to be sold to the Water Department, which has sinking funds to invest. The railway superintendent states that the reduction of running time on Meridian Avenue, Phinney Ridge and Green Lake lines will increase the revenues.

City Orders Brunswick Company to Remove Rails

The City Commission of Brunswick, Ga., recently adopted a resolution instructing the Brunswick & Interurban Railway to remove its tracks beginning on Newcastle and Gloucester Streets, and then on other streets until all have been removed and the streets repaved in the same condition as those parts adjacent. Some time ago the sale of the rail and overhead of the company was reported with the intimation that the purchaser intended to salvage the old tracks, but to junk all of the other material. Apparently this deal was never concluded and the company still has the property on its hands. It is trying to make some disposition of the rails and hopes to be able to do so before long. The matter evidently has been brought to a head by the condition of the paving in several places in Newcastle Street, because the city will not consider repairing the paving until the rails are up and out of the way. The company that owns the rails was composed of a group of public-spirited citizens who bought the car line in an endeavor to keep it operating. The owners have been figuring on selling the rail to reimburse themselves for losses sustained in operating the company.

Franchise Details Completed in Louisville

All details of the new franchise and operating ordinance of the Louisville Railway with the city of Louisville, Ky., have been completed, the bill having been passed by the Board of Councilmen, Board of Aldermen and signed by Mayor A. A. Will. The company has 60 days in which to accept the provisions of the law. The car fare rate will remain at 7 cents straight as at present, with half fare for school children and free rides for policemen and firemen in uniform, as well as park guards. The contract also provides for transfers from bus lines to street car lines, with a maximum of 10 cents for combination rides. The ordinance is to run for a period of two years, after which a readjustment of fare rates will be based on earnings.

Deadlock in Newark, Ohio

Citizens and company are still talking it over in Newark, Ohio. Despite many conferences attended by prominent citizens who have the best interests of the city at heart, no tangible plan for the restoration of railway service has been evolved that is satisfactory to the Southern Ohio Public Service Company. There were stumbling blocks enough in the past to a settlement, but it now develops that the Council, in passing the city-wide bus ordinance, legally authenticated competition under a grant in some respects just as binding as that under which the Southern Ohio Public Service Company functioned. No ready means appears to be at hand to nullify this ordinance, a condition understood to be necessary to secure the resumption of railway and bus service by the Southern Ohio Public Service Company.

"Follow the Ball!" Says Dana

Edward Dana, not as general manager of the Boston Elevated Railway, Boston, Mass., but as plain Edward Dana, tells the employees of the railway in *Co-operation* for August that now is the time to plan ahead in order that the ninth year of public control may end sucessfully on June 30, next. He says that this year "calls for the best our organization can give." As he sees it, the degree of success that is reached "will be governed by the extent to which we 'follow the ball' daily and weekly until June 30." He asks the men to "exert every effort to increase revenue by rendering courteous service and displaying real interest in our patrons."

Incidentally *Co-operation* hammers away at the idea of increased car riding. It spreads the gospel that "A Ride a Day Keeps Poor Service Away," and says: "Secure all the fares, guard transfer losses, cultivate more riders. It's our business." And in this work it recognizes that "modern rolling stock is necessary to provide adequate and dependable car service." Then the company furnishes these facts:

New rolling stock costing $13,905,935 has been placed in service on the lines of the Elevated since July 1, 1918, as follows:

35	Cambridge subway cars..	$657,597
48	East Boston tunnel cars..	889,390
65	Elevated cars	1,305,698
296	Center-entrance cars	4,108,593
46	Trail cars	317,518
461	Double-end surface cars..	5,344,857
184	Single-end surface cars and buses	1,282,282
1,135		$13,905,935

There are 82,450 electric passenger cars in operation in the United States.

28,085, or 34 per cent, are more than twenty years old.

30,685, or 28.7 per cent, are between ten and twenty years old.

23,680, or 37.3 per cent, are less than ten years old.

On the Boston Elevated approximately 46 per cent of the cars have been purchased since 1918 and the average age of all cars is only nine years.

The rapid transit lines have 79 per cent of the service operated on the Boston Elevated with all steel cars, Philadelphia has 100 per cent, New York 50 per cent, and Chicago 24 per cent.

In 1918 the cars out of service for repairs amounted to 17 per cent, whereas in 1926 only 6 per cent are under repairs.

The total of reported car defects for each 10,000 miles operated is only 5.3 at the present time.

"L" Platform Extension Work in Chicago Nearly Finished

Completion of the Chicago Rapid Transit Company's program of station platform extension is expected soon. The platforms of elevated stations in the Loop district were the first to be completed after the work was begun last autumn. In many instances platform lengths have been virtually doubled to take the new eight-car express trains.

The Lake Street west side division has already been completed and the final extension on the south side division is being made at the 55th Street station. A new section of steel structure has been installed at Sheridan Road on the north side division to permit straightening of tracks for lengthening the platforms. The Addison Street station is all that remains to be extended on this division.

Extension work on the Garfield Park branch was finished last month, and when the three other branches of the Metropolitan division are equipped with longer platforms the facilities for passenger handling over the entire Rapid Transit system will be greatly increased.

$1,500,000 to Be Spent by Ohio Interurban

Improvements to cost $1,500,000 are proposed by the Cincinnati, Hamilton & Dayton Traction Company, Cincinnati, Ohio The program provides for the construction of a freight siding in Cumminsville, at which place the interurban company's Cincinnati terminus is located. Quite recently the City Council of Cincinnati granted the interurban company a 25-year franchise to enter the corporate limits of Cincinnati. New equipment will be purchased and general improvements made to the roadway.

Something May Be Told

OF THE hundreds of corporation executives who have been discussing with animation Professor Ripley's strictures upon the reticence of annual reports, not a few have offered a rebuttal which fails to rebut. . . . Professor Ripley's main premise, that the stockholder has a right to enough information to enable him to draw intelligent conclusions concerning both the safety and the profitableness of his investment, is unassailable. . . .

That the majority of stockholders throw annual reports away unread is more easily asserted than proved. The assumption cannot be offered in defense of present practice, if only on the principle that the accused cannot take advantage of his own wrongdoing. If annual reports are not read, it is primarily because so many of them are either unreadable or not worth reading.

To publish a mass of technical and uncorrelated facts is not to meet the stockholder's legitimate demand. He is not an auditor and neither are the directors of the company auditors. The chief executive has no difficulty in making himself intelligible when he talks to the board; neither does he find it impossible to engage their interest. The difference is that in one case he wants to do these things and in the other he frequently doesn't. But he should infinitely prefer to make the effort, rather than have bureaucratic dictation dragged into a naturally personal and private relation.

It has been remarked that schools should be opened for the training of stockholders in the study of corporation affairs. H. G. Wells supports Carlyle in his dictum that the only real university consists of books. What better university for the stockholder can there be than annual reports of going—or coming—concerns, properly written?—*Wall Street Journal.*

Contempt Action to Be Appealed by Detroit

Charles P. O'Neil, corporation counsel of the city of Detroit, has announced that he will initiate before the Michigan Supreme Court certiorari or mandamus proceedings for the purpose of setting aside contempt proceedings brought against William P. Rutledge, commissioner of police, in the jitney case.

Judge Guy A. Miller in Circuit Court refused to set aside the proceedings, which were started after Rutledge is alleged to have violated the injunction issued by Judge Harry J. Dingeman restraining the police from interfering with the jitney drivers. Judge Miller held that the injunction issued by Judge Dingeman was valid. O'Neil maintains that it was void and for that reason the contempt proceedings were not legal. It is upon this point that an appeal is planned. Details of the controversy between the city of Detroit and the jitney drivers were told in the ELECTRIC RAILWAY JOURNAL of July 31.

Vote on Detroit Transit Plan in Spring

The rapid transit ordinance, embodying a subway system for Detroit, Mich., to cost approximately $180,000,000, will not be submitted to the voters at the Nov. 2 election, but will in all probability be presented to the people for final action in the spring.

Mayor John W. Smith said he believed additional time should be given for the thorough study of the project, in view of the enormous amount of money involved. At the hearing before the City Council at which the matter came up for discussion serious opposition to the plan advanced by the transit commission developed, especially as applied to the proposed plan for the financing of the scheme. The Mayor believes that with more than 200 candidates seeking office at the November election the opportunity for proper discussion of the transit question does not present itself.

Sidney D. Waldon, chairman of the Transit Commission, stated that it was his personal opinion that the people should have ample time to study the question.

The plan for Detroit was reviewed in the ELECTRIC RAILWAY JOURNAL for Aug. 28, page 355.

News Notes

Easton Road Gradually Ceasing Service.—The Philadelphia & Easton Electric Railway, Doylestown, Pa., has discontinued carrying United States mail between Easton and Doylestown. The company will continue in service a few more months. The road has already discontinued service into Easton.

Rerouting Proposed to Speed Up Service.—In an effort to furnish faster service on the Olive-University and Olive-Delmar lines the United Railways, St. Louis, Mo., proposes to consolidate the Olive-University and Olive-Maryland lines and change the routing of the

Olive-Delmar line. Consent of 51 per cent of property owners of three blocks is needed to make the proposed changes. As usual some are opposing the plan, which means better facilities for many thousands of residents of the territory served.

Strike Pickets Discharged by Indianapolis Judge.—On the grounds that the strike was over and "there should be no malice," Judge Paul C. Wetter in Municipal Court Sept. 2 dismissed a woman and six men who appeared to answer charges of picketing, congregating and vagrancy, preferred against them during the recent strike of employees of the Indianapolis Street Railway. Mrs. Jeanette O'Brien, the woman, had been prominent as a speaker and leader at meetings of strikers.

More Power Sought by Brooklyn Company. — The Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., is negotiating with the Brooklyn Edison Company for a contract by which the latter would supply such additional power as may be needed by the B.-M. T., which now produces part of its power and obtains the remainder from the Interborough Rapid Transit Company.

Denver Orphans Ride Free.—The Denver & Intermountain Railroad, operating between Denver and Boulder, Col., on the recent receipt of its seventeen new buses invited the orphans of Denver to a free ride throughout the city. The line, known as the "Kite" route, operates buses as an auxiliary to its electric railway service.

Jamaica Line Issues Time-Table Booklet.—The Jamaica Central Railways, Inc., Brooklyn, N. Y., has furnished a time-table for its patrons of the Belmont Park and Liberty Avenue Divisions. In the foreword the company expresses the intention of exercising the greatest care in operation and of adhering rigidly to these schedules. Interruptions, which are usually due to causes beyond the company control, will no doubt occur, but everything will be done to restore service to normal as quickly as possible. The booklet includes a list of the officers of the company. The time-table carries advertising of local merchants.

Six Hundred Cars of Peaches.—Fruit movements on the Salt Lake & Utah and the Bamberger Electric Railroads, Salt Lake City, Utah, have been said to indicate one of the heaviest total shipments in the history of the lines. A total of 600 cars of peaches is expected to be moved to Eastern and Middle Western centers during the month of September. The Bamberger line, serving the territory between Ogden and Salt Lake, from early estimates will handle about 200 cars of the fruit for New York, Chicago, St. Louis, Kansas City, Detroit and other centers of population. The Orem line, serving Utah County, will move about 400 cars, if predictions are fulfilled. Shipments of peaches started fully two weeks ahead of the usual season. Cantaloupes also will be shipped eastward in great quantities, although not in as large numbers as peaches.

Recent Bus Developments

Report on New York Bus Proposals Expected Sept. 15

Mayor Walker of New York has called a special meeting of the Board of Estimate for Sept. 15 to receive the report of the Board of Transportation analyzing the bus franchise applications which have been pending several months. No action will be taken on Sept. 15, Mayor Walker said, because the board members will need time to study the report first.

Chairman John H. Delaney of the Board of Transportation says his completed report will comprise 1,000 pages. It is assumed it will deal with the respective virtues of the three city-wide bus systems proposed and the borough and sectional bids which make up the 70-odd applications.

Another feature which has received attention by the board is that of fare rates which will prove most desirable to the public and still afford income sufficient to enable the operators to pay their franchise tax to the city. The proposals range from a flat 5-cent fare to a flat 10-cent fare.

Mayor Walker said the Board of Estimate would probably vote to refer the report to the committee of the whole and then study it informally. He thought it probable the members might be prepared to take action at the regular meeting on Sept. 21.

Express Service in Buffalo

Express bus service has been started by the International Bus Corporation, a subsidiary of the International Railway, Buffalo, N. Y., on the Delaware Avenue line between the downtown business district and the Kenmore-Tonawanda village line. The one-way fare is 25 cents, compared with 15 cents for the usual service. Only four stops are made in the city of Buffalo, one at the Buffalo city line and two in the village of Kenmore. The stops are marked with signs. The express service is ten to fifteen minutes faster from terminal to terminal than the local service. Double-deck buses are run during the morning and evening rush hours.

Traction Company Opposes Steam Road Bus Charter

The petition of the Alton Transportation Company, a subsidiary of the Chicago & Alton Railroad, for permission to operate motor coaches between Jacksonville and East St. Louis, Ill., was opposed by officials of the St. Louis Electric Terminal Railway, St. Louis, Mo., at a Commerce Commission hearing in Chicago recently.

The St. Louis Electric Terminal Railway is a subsidiary of the Illinois Power & Light Corporation and according to E. A. Roehry, general manager and one of the principal witnesses, the granting of a charter to the railroad's bus line to do a local business in Venice, Madison and Granite City would divert substantial traffic from the traction company's lines.

Mr. Roehry declared that his company has more reserve equipment than is needed at peak hours now. He produced numerous exhibits to show that the Illinois Power & Light Corporation absorbs a deficit registered by the St. Louis Electric Terminal Railway almost every year.

Buses on Templeton-Gardner Run

Stockholders of the Templeton-Gardner Street Railway, Templeton, Mass., have voted to ratify a decision of the directors to substitute bus service for electric service on the company's lines. Orders have been placed for the immediate delivery of the latest type passenger buses, and it is expected the complete change from electric to bus service will take place within 60 days.

Community Builder in Oregon

Another bus has been added to the fleet of the Oregon City Motor Bus Company, under the direction of G. C. Fields, superintendent of the interurban lines of the Portland Electric Power Company, Portland, Ore. These buses run between Portland (Sixth and Salmon Streets terminal) and Oregon City over the West Side Highway, serving the communities of Dunthorpe-Oswego, Bolton and West Linn en route, and maintain a 30-minute schedule between terminals on weekdays and more frequent service on Saturdays, Sundays and holidays.

When the Oregon City Motor Bus Company commenced operation on this line on Sept. 24, 1924, the West Side Highway between Portland and Oregon City was without a dependable transportation system and in consequence there was very little building activity along the way. The Oregon City Motor Bus Company purchased first-class equipment, put on frequent and dependable service and in a short time real estate values commenced to move and homes to arise.

Lakewood, located between Oswego and Oswego Lake on the peninsula, has been developed into one of the most beautiful residential spots in the country. About ½ mile south of the town of Oswego, at the foot of Oswego Lake, one of the finest bathing, boating and picnic resorts to be found anywhere is patronized by thousands of people, particularly on Sundays and holidays. The buses discharge and pick up passengers at the entrance and may be credited in a large measure with building up this resort. Robinwood, a beautiful and sightly tract just south of Marylhurst, has been opened up recently and promises to be a fine residential district. Many new homes have recently been built at Bolton and West Linn and many more are under construction. These activities are all reflected in increased travel on the buses. At the present time the Oregon City Motor Bus Company owns and operates three Yellow coaches and four Fageol "Safety" coaches over this route.

Buffalo-Niagara Falls Operation Sanctioned

The Public Service Commission of New York on Sept. 2 granted to the International Bus Corporation a certificate of convenience and necessity for the operation of a bus line between Buffalo and Niagara Falls.

Opposition was offered to the granting of the certificate by the New York Central Railroad, the Lehigh Valley Railroad and M. L. Van Dyke, operating a sightseeing bus line between Buffalo and Niagara Falls, Ont.

At the hearing on the application, which was held in Buffalo on Aug. 16, it was shown that the International Bus Corporation, a subsidiary of the International Railway, proposed to substitute buses on certain lines to meet an increasing and insistent demand on the part of the public for bus transportation.

No local passengers will be carried in the village of Kenmore, the town of Tonawanda, city of Tonawanda, city of North Tonawanda, or from Tonowanda to North Tonawanda, town of Wheatfield, the village of LaSalle or the city of Niagara Falls.

The buses will be operated on an hourly schedule from 8 a.m. to 8 p.m. from Buffalo and from 8.30 a.m. to 7.30 p.m. from Niagara Falls, with an additional trip from Niagara Falls at 10 p.m.

Rates of fare will be: Buffalo to Kenmore, 25 cents; town of Tonowanda, 35 cents; city of Tonawanda, 50 cents; town of Wheatfield, 70 cents; LaSalle, 80 cents, and Niagara Falls, $1.

New Bus-Trolley Equipment for Richmond

The Virginia Electric & Power Company has placed orders for $500,000 in new bus-trolley equipment for Richmond's unified transportation system, following the action of the Board of Aldermen in over-riding, by a vote of nine to one, Mayor J. Fulmer Bright's veto of the bus line ordinance. The measure became a law on Sept. 3. Officials of the company say equipment has been ordered sufficient to render satisfactory service on all the new routes and that operations would start about Jan. 1. The orders just placed also include some new trolley equipment for extensions and betterments that are to be made, and this work was started without delay, as well as the rerouting that is to be carried out under the blanket trolley franchise recently adopted.

Municipal Buses at Buffalo a Costly Farce

Local newspapers in Buffalo, N. Y., are calling upon Mayor Frank X. Schwab, who started the municipal buses after his return from Europe, to give a detailed accounting of the $15,000 bus fund voted by the City Council. Charges are made that all this money has been spent and that the income from the operation of the municipal buses, run in competition with the lines of the International Railway and its subsidiary, the International Bus Corporation, is not sufficient to pay the operating expenses. Newspaper editorials say that continued operation of buses by the Department of Public Safety is piling up a big deficit for the taxpayers to discharge.

Letters from the public being printed in Buffalo newspapers describe acts of discourtesy by the policemen-conductors, attempts by drivers of the municipal buses to coerce drivers of the double-deck buses of the International system and cite cases in which abusive language has been used by the policemen-conductors toward passengers and crews on International operated bus routes.

Change of Route Starts Bus Battle in Ohio

What may be the first skirmish to an extended legal battle between the suburban bus companies and interurban railroads operating from Cincinnati, Ohio, to surrounding villages recently developed in the Common Pleas Court of Clermont County.

F. A. Nichols, general manager of the Cincinnati, Georgetown & Portsmouth Electric Railway, appeared before Common Pleas Judge Charles White at Batavia and obtained an injunction against Victor Nobis, owner of the Cincinnati-New Richmond Bus Company. Mr. Nichols told Judge White that the bus had taken passengers on in territory which legally was to be served by the Cincinnati, Georgetown & Portsmouth Railway only.

Due to recent washouts which destroyed several small bridges on the River Road, Nobis, according to Mr. Nichols, changed his bus route from the River Road to the Grant Highway, deviating far up on the road and detouring through Mount Pisgah, Lynnedale and Hamlet and going thence over the road between Fruit Hill and Mount Washington.

According to Mr. Nichols, the territory between Hamlet and Cincinnati is reserved for electric railway traffic only. Basing his decision on the complaint, Judge White issued the temporary injunction. No date has been set for the final hearing.

Railway Granted Bus Privilege

The Public Service Commission of New York has issued an order granting the Binghamton Railway Bus Lines, Inc., certain bus rights. The railway is permitted to lease for a period of five months from Sept. 1, 1926, the operating rights, together with the equipment, of the Triple Cities Bus Lines, Inc., and Edward J. Dorey for bus routes in certain streets in the city of Binghamton, the village of Endicott and the towns of Dickinson, Union and Vestal in Broome County. The Binghamton Railway Bus Lines, Inc., applied to the Public Service Commission on Aug. 9 for the right to lease the above-mentioned property. The stock of the petitioner, it was stated, was owned by the Binghamton Railway, which stated that it had amended its certificate of incorporation so that it might operate the bus lines in conjunction with the existing service on the trolley lines. In the transaction were included eight buses, which would bring the total number of buses owned and operated by the Binghamton Railway up to eleven. Under the plan the belt line would be so combined with the bus line now being operated by the railway as to cover more territory.

Denver Extends Bus System.—The Bus Transportation Company, a subsidiary of the Denver Tramway, Denver, Col., has applied to the State Board of Public Utilities for a permit to operate an automobile line between Denver and Golden on West Colfax Avenue and the Golden paved road.

Transfers Interchanged.—The Virginia Electric & Power Company, Richmond, Va., began the interchange of transfers from its trolley cars to the buses on Sept. 5. Also effective Sept. 5 a straight 8-cent fare was being charged on the buses. The railway fare is 7 cents with transfers from street cars to buses costing an extra cent.

Bus Line Discontinued in Washington.—The Capital Traction Company, Washington, D. C., has been directed by the Public Utilities Commission of the District of Columbia to discontinue the operation of its Rock Creek Park Golf Course bus line. Under the date of Aug. 11 the company submitted to the commission the operating results for the months of May, June and July showing a total loss for the three months of $1,326. A hearing was held in July, at which the railway showed that the line was operated at a loss. The application was opposed by the concessionaire of the golf course and by the Director of Public Buildings and Public Parks, and the company's representative finally requested that no action should be taken at that time, but that the returns from a longer summer period should be awaited.

Extension of Bus Service in Indiana.—G. O. Nicholai, manager of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has announced a further improvement in the bus service of his company. On some routes buses are being added and on others the lines are being extended.

Railway Has Competing Bus Line Suspended.—Operation of the bus line run for the last five years by F. W. Herzog between Edwardsville and Glen Carbon, Ill., a distance of 5 miles, was suspended Aug. 31 on an injunction granted by Circuit Judge George A. Crow at Belleville on an application filed by the East St. Louis & Suburban Railway, East St. Louis, Ill. The company contended that Herzog had failed to obtain a certificate of convenience and necessity from the Illinois Commerce Commission. Herzog stated that he had applied to the Commerce Commission for the permit some two months ago. He also sought to have the line extended to Granite City, Ill. Counsel for Herzog announced that an appeal would be taken.

Financial and Corporate

Net Off in St. Louis

Receiver Reviews Conditions Which Confronted Company in 1925—Prospects Ahead Are Better

Gross operating revenue of the United Railways, St. Louis, Mo., for the year ended Dec. 31, 1925, was $18,894,574. This compares with the sum of $19,515,275 for 1924, or a decrease of $620,700. Net income for 1925 showed a loss of $206,174 compared with a surplus of $29,876 for 1924, or a decrease of $236,051 for the year. These and other significant facts about the operation of the company are all contained in the pamphlet report of the company for the year presented by Rolla Wells, the receiver, of which this account is merely a digest.

No interest has been paid on the underlying bonds, or on the bonds of the St. Louis Transit Company, since Oct. 1, 1923, and no interest has been paid on the St. Louis & Suburban Railway general mortgage 5 per cent bonds since April 1, 1923. Interest has been accrued on the books to Dec. 31, 1925, at the rates provided by the mortgages and extension agreements, on all the issues of bonds.

The amount expended by the protective committee of the St. Louis Transit Company bondholders in payment of interest coupons No. 49, on United Railways first general mortgage 4 per cent bonds due Jan. 1, 1924, was refunded to that committee on Feb. 15, 1926, with interest at 6 per cent by order of federal court.

The receiver was authorized by the court on Feb. 15, 1926, to enter into a contract with the reorganization committee conformably to the committee's offer of Feb. 10, 1926, providing for payment of series "B" receiver's certificates, the obtainment of $6,000,000 par value United Railways 4 per cent bonds in exchange for divisional bonds, and the sale of 4 per cent bonds to the reorganization committee.

The outstanding issue of $4,200,000 series "B" receiver's certificates was called for payment April 1, 1926, at 100½ and accrued interest. The principal of these certificates, together with accrued interest and premium for calling the issue before maturity, aggregating $4,347,000, will be paid with $1,900,000 cash supplied by the reorganization committee and $2,447,000 supplied by the receiver from funds on hand.

The three issues of divisional bonds, viz.: Compton Heights, Cass Avenue and Lindell bonds, aggregating $4,100,000, were also called for payment on April 1, 1926.

On Feb. 23, 1926, the court ordered the St. Louis Union Trust Company, trustee under the mortgage securing the first general mortgage 4 per cent gold bonds of the United Railways, to certify and issue to the receiver $6,000,000 par value of United Railways 4s, which bonds will be delivered by the receiver to the reorganization committee, for $6,000,000 cash supplied by it for part payment of series "B" receiver's certificates, and for refunding the three issues of divisional bonds amounting to $4,100,000 par value.

The court also ordered the trustee to cancel $3,768,000 first general mortgage 4 per cent gold bonds of the United Railways remaining in its hands for refunding divisional bonds.

The payment of the receiver's certificates and the three issues of divisional bonds on April 1, 1926, will cure the default in the United Railways first general mortgage 4 per cent bonds, which bonds will remain on the property until their maturity July 1, 1934, in accordance with the plan and agreement for the reorganization of the company, dated Oct. 1, 1924.

No payments were made during the year on the liability of $2,396,321 for mill tax due the city of St. Louis, this

STATEMENT OF FUNDED DEBT OF UNITED RAILWAYS, ST. LOUIS

Issue	Total Outstanding Dec. 31, 1925
Underlying bonds:	
Compton Heights, Union Depot & Merchants Terminal Railroad, first mortgage 6s, due 1923	$986,000*
Cass Avenue and Fair Grounds Railway, first mortgage 6s, due 1923	1,640,000*
Lindell Railway, first mortgage 8s, due 1923	1,474,000*
St. Louis & Suburban Railway, consolidated mortgage 8s, due 1923	2,000,000*
Total underlying bonds	$6,100,000
United Railways of St. Louis, first general mortgage 4s, due 1934	30,300,000*
St. Louis & Suburban Railway, general mortgage 5s, due 1923	4,500,000*
St. Louis Transit Company 5s, due 1924	9,790,000*
Total	$50,690,000
Receiver's certificates, series "B" 6s, due 1926	$4,200,000

* In default.

CONSOLIDATED INCOME AND EXPENSE STATEMENT OF THE UNITED RAILWAYS ST. LOUIS, YEAR ENDED DEC. 31, 1925

Operating Revenue:		
Revenue from transportation:		
Passenger revenue	$18,628,734	
Special car revenue	31,288	
Express revenue	9,753	$18,669,775
Revenue from other railway operations:		
Station and car privileges	$172,754	
Rent of equipment	1,765	
Rent of buildings and other property	23,663	
Sale of power	26,615	224,798
Gross operating revenue		$18,894,574
Operating Expense and Charges:		
Current operating expense:		
Way and structures	$1,055,856	
Equipment	1,690,175	
Power	1,852,732	
Transportation expense	6,708,803	
Traffic expense	22,630	
Injuries and damages reserve	1,133,674	
General and miscellaneous	720,203	
Depreciation reserves	1,500,000	
	$14,684,076	
Taxes	1,810,701	
Total operating expense, depreciation and taxes		$16,494,778
Income from operation		$2,399,796
Non-operating Income:		
Rents—Less expenses and taxes	$11,092	
Interest on deposits	13,503	
Interest from investments	260,829	
Miscellaneous	24	285,449
Gross income		$2,685,246
Other Deductions:		
Interest on bonded debt	$2,361,980	
Interest on receiver's certificates	252,000	
Interest on bond interest coupons matured—not paid	36,360	
Interest on mill tax judgments	143,779	
Amortization of discount and expenses in connection with sale of receiver's certificates, Series "B"	74.717	
Income tax on bond coupons	21,000	
Bank services, payment of bond and receiver's certificates, interest coupons	2,677	2,892,514
Net loss for the year from railway operations		*$207,268*
Less: Net rental income from bus equipment		1,093
Net loss for the year		*$206,174*

CONDENSED INCOME ACCOUNT OF THE UNITED RAILWAYS, ST. LOUIS, FOR YEAR 1921 TO 1925, INCLUSIVE

	1925	1924	1923	1922	1921
Revenue from transportation	$18,669,775	$19,288,743	$20,220,765	$19,740,118	$19,498,946
Revenue from other railway operations	224,798	226,531	232,679	223,437	159,604
Gross operating revenue	$18,894,574	$19,515,275	$20,453,445	$19,963,555	$19,658,551
Operating expenses (including depreciation)	14,684,076	15,093,195	15,123,183	14,895,508	15,093,218
Surplus over operating expenses	$4,210,498	$4,422,080	$5,330,262	$5,068,047	$4,565,332
Taxes	1,810,701	1,772,134	1,832,602	1,845,722	1,675,697
Income from operation	$2,399,796	$2,649,945	$3,497,659	$3,222,324	$2,889,635
Income from other sources	285,449	287,870	225,700	202,830	216,349
Gross income (less operating expenses and taxes)	$2,685,246	$2,937,816	$3,723,359	$3,425,155	$3,105,985
Deductions from income	2,892,514	2,907,939	2,913,614	2,912,063	2,802,939
Net income—Railway	*$207,268*	$29,876	$809,745	$513,091	$303,045
Net rental income from bus equipment	1,093	0	0	0	0
Dividends	0	0	0	[illegible]	0
Surplus	*$206,174*	$29,876	$809,745	$513,091	$303,045

Figures in italic denote deficit.

TRAFFIC STATISTICS

	1925	1924	1923	1922	1921
Revenue passengers	270,105,400	279,222,520	292,671,781	286,076,475	282,447,190
Transfer passengers	145,698,764	149,555,651	155,343,193	152,261,868	150,562,354
Total passengers	415,804,164	428,778,171	448,014,974	438,338,343	433,009,544
Percentage of revenue passengers using transfers	53.94	53.56	53.08	53.22	53.31
Average fare per passenger (including transfers), cents	4.48	4.49	4.50	4.49	4.49
Average fare per revenue passenger, cents	6.90	6.89	6.89	6.89	6.89
Passenger car-miles	42,440,837	43,911,064	45,652,714	44,229,300	44,229,210
Revenue passengers per car-mile	6.36	6.36	6.41	6.47	6.39
Total passengers per car-mile	9.80	9.76	9.81	9.91	9.79

STATEMENT OF CAPITAL EXPENDITURE MADE BY THE UNITED RAILWAYS, ST. LOUIS, 1925

Way and structures	$318,084
Equipment	91,033
Power	6,563
Total additions	$415,681
Deductions:	
Way and structures	$21,728
Equipment	183,118
Power	13,801
Total deductions	$218,648
Net addition during the year	$197,032

amount being the balance of judgment obtained by the city against the company for mill tax to Dec. 31, 1918. The interest on this judgment, however, has been provided on the books to Dec. 31, 1925, and the current mill tax has been paid regularly.

The total taxes, street paving costs and expense on account of city sewers construction were $2,229,193, or 11.8 per cent of gross operating revenue, or 0.825 cent per revenue passenger, as compared with 0.796 cent per revenue passenger in 1924.

In addition to the direct taxes the United Railways expended $365,399.65 for street paving and furnished free transportation for the policemen and firemen of St. Louis.

There was also expended and charged to operating expenses an amount of $23,993.97 for carrying tracks over or around new sewers built by the city.

The total mileage in single track on Dec. 31, 1925, was as follows:

	Miles
City track	347.2787
County track	115.6013
Total	462.8800

During the year 1925, 0.7486 mile of track was added and 1.0440 miles was removed.

Since 1904 the amount of track reconstruction, renewal and extensions of track of the company in the city and county was as follows:

Year	Miles	Year	Miles
1904	21.56	1916	15.39
1905	8.90	1917	19.72
1906	29.18	1918	15.80
1907	21.65	1919	25.01
1908	32.99	1920	26.50
1909	39.93	1921	29.82
1910	45.34	1922	23.54
1911	32.69	1923	26.82
1912	25.85	1924	26.24
1913	27.72	1925	17.28
1914	21.77		
1915	28.05	Total for 22 years	561.75

The number of passenger cars owned at the end of 1925 was 1,608, of which 1,429 were motor cars and 179 trail cars. This compared with 1,638 at the end of 1924, 1,614 at the end of 1923 and 1,579 at the end of 1922.

Thirty-two passenger cars were retired from service and destroyed during 1925 and two special cars, "Ariel" and "Electra," were converted into passenger cars for use on the St. Charles line.

One hundred and forty-three cars were remodeled by changing old-type folding steps to well-type steps, with manually operated doors.

One hundred and ninety cars were equipped with a manually operated tripping device on rear door operating mechanism, preparatory to one-man operation.

One hundred and fifty-four cars were provided with special sash at conductor's booth to give conductor a clear view.

Twenty-six cars of the large "600" type were equipped with independent air compressors to replace the storage air equipment.

One flat car was entirely rebuilt and provided with steel underframing in place of wood.

Twenty cross-bench open cars were provided with additional guard rods the full length of car on closed side.

The roofs of 527 cars were painted.

	Cars
General overhauling and repainting	320
Car body and collision repairs	1,413
Truck and motor repairs	195
Revarnishing	377
Total	2,305

This total compared with a total of 2,245 in 1924, and 1,861 in 1923.

Five Six-Wheel Safeway 29-passenger buses were purchased, the chassis from the Six-Wheel Company and the bodies from St. Louis Car Company.

The seven automatic substations, installed principally during 1924, have resulted in improved operating voltage, decreased distribution losses, better return-circuit conditions and (due to decreased loads at adjoining stations) a reduction in the cost of maintenance of substation equipment. Studies are being made to determine the most efficient operating methods under various conditions, substation and transmission losses at different loads being balanced against distribution losses.

In spite of the fact that the number of automobiles registered in St. Louis in 1925 was more than 8 per cent greater than in 1924, and nearly four times as great as at the beginning of the receivership, and in spite of the increased number of buses and bus lines, the increased efficiency of operations and the excellent co-operation on the part of the police department not only prevented a decline but actually caused an improvement in the street car transportation service.

The average miles per hour (including terminal delays, etc.) for 1925 was 9.76, as compared with 9.73 in 1924 and 9.75 in 1923.

The average number of revenue passengers in 1925 was 3.27 per cent less than in 1924. Car-miles in 1925 decreased 3.35 per cent from 1924 and car-hours decreased 3.01 per cent.

A check made of a typical day of the traffic in and out of the congested business district, as published by the special committee of the Board of Aldermen, was as shown in the accompanying table.

As in the past two or three years, since the great growth of the automobile traffic, the Saturday, Sunday and holiday street car traffic showed in 1925 a much greater falling off than that of the remaining days of the week as shown in the accompanying table.

Toward the latter part of 1925 and in the early part of 1926 it would appear that the street car traffic is again beginning to increase and to be gaining proportionately over automobile and bus competition.

The popularity of the street car service is also being gradually increased by the co-ordinated system of transportation started in connection with the St. Louis Bus Company early in 1925. Under that system the 10-cent fare on the bus gives free transfer privilege to street cars, and transfers from the street cars to buses are issued on the payment of 3 cents in addition to the regular 7-cent street car fare. These buses are all run in extension of or in supplement to the street railway service, and seven lines of these buses are now in operation.

TRAFFIC IN AND OUT OF THE CONGESTED BUSINESS DISTRICT OF ST. LOUIS

(Entire business day, 7 a.m. to 6 p.m., both in and out)

	Vehicles		Passengers		Passengers per Vehicle
	Number	Per Cent of Total	Number	Per Cent of Total	
Street cars	9,645	9.6	308,779	62.8	32.1
Private automobiles	87,700	87.2	142,759	29.0	1.6
Buses	1,976	2.0	36,233	7.4	18.3
Service cars	1,208	1.2	3,913	0.8	3.2
Total	100,529	100.0	491,684	100.0	4.9
Commercial vehicles	37,837	.....	50,893	.....	1.3
Total	138,366	.....	542,577	.....	3.9

(Maximum hour, p.m. peak, leaving district, one way only)

	Vehicles		Passengers		Passengers per Vehicle
	Number	Per Cent of Total	Number	Per Cent of Total	
Street cars	868	8.4	62,332	72.4	71.8
Private automobiles	9,291	89.3	17,601	20.4	1.9
Buses	123	1.2	5,557	6.5	45.2
Service cars	117	1.1	634	0.7	5.4
Total	10,399	100.0	86,124	100.0	8.3
Commercial vehicles	2,722	.....	3,576	.....	1.3
Total	13,121	.....	89,700	.....	6.8

PASSENGER REVENUE

	Days	Year 1925	Days	Year 1924	Decrease	Per Cent Decrease
Total		$18,628,734		$19,247,650	$618,916	3.22
Average day	355	51,037	366	52,589	1,551	2.95
Average week-day	257	53,637	256	55,053	1,415	2.57
Average Saturday	50	55,394	51	57,146	1,751	3.06
Average Sunday	52	35,931	52	38,105	2,174	5.71
Average holiday	6	34,280	7	36,859	2,579	7.00

Holidays: New Year's Day, Decoration Day, Independence Day (year 1924, 4th and 5th), Labor Day, Thanksgiving Day, Christmas.

During the year one-man operation of street cars was put into effect on Sundays only on the Park line, Compton line, Tower Grove line and the Sarah line. Cars have gradually been fitted for such service and operators broken in for one-man operation on various lines. Regular one-man operation was also put into effect on October, 1925, on that part of the St. Charles line between Wellston and Woodson Road.

In order to bring about a uniform system of entrance on all types of cars and to bring weekday operations in that respect in line with the one-man operations on Sundays, and in order to increase the rapidity of loading of cars, a general front-entrance arrangement with "pay-as-you-pass-conductor" system went into effect in November, 1925.

In the summer of 1925 an ordinance was passed prohibiting parking of automobiles in certain congested districts between 7 a.m. and 10 a.m. and between 4 p.m. and 6 p.m. These hours were later changed by a new ordinance to 7 a.m. to 9:30 a.m. and 4:30 p.m. to 6 p.m. This arrangement has helped materially in getting cars through those districts.

There was no change in the basic 7-cent fare during 1925.

The total number of employees on Dec. 31, 1925, was 5,811, compared with 5,803 on Dec. 31, 1924, and with 6,014 on Dec. 31, 1923. The maximum number of employees during 1925 was 6,269 compared with 6,361 in 1924.

No changes in agreements as to wages and working conditions were made in 1925. But a materially decreased labor turnover and the reaching of the fourth year wages by an increased percentage of motormen and conductors made a material increase in the average wages in that department over the previous years.

The total miles in single main track of the Missouri Electric Railroad on Dec. 31, 1925, were 23.4838. Of this mileage 7.6551 was double track, measured as such, and 7.8922 single track, measured as such. In addition to the above there was 0.2814 mile of spurs and miscellaneous track. This main track mileage includes 2.5139 miles of track of the St. Louis County Street Railroad, operated as part of the Missouri Electric.

INCOME STATEMENT OF THE MISSOURI ELECTRIC RAILROAD

	Year Ended Dec. 31, 1925	Year Ended Dec. 31, 1924
Revenue from transportation	$154,897.96	$164,746.82
Revenue from other railway operations	2,505.10	2,114.26
Gross operating revenue	$157,403.06	$166,861.08
Current operating expense and depreciation	$160,252.30	$158,973.04
Taxes	13,709.88	12,452.80
Total operating expenses, depreciation and taxes	$173,962.18	$171,425.84
Loss from operation	$16,559.12	$4,564.76
Non-operating income	1,521.50	1,624.30
	$15,037.62	$2,940.46
Interest on bonded indebtedness	35,000.00	35,000.00
Net loss for the year from railway operations	$50,037.62	$37,940.46
Net loss from bus operations	*$9,507.19*	....
Net loss for the year	*$59,544.81*	*$37,940.46*

Financier Optimistic

Representative of Banking House Says Carefully Selected Bonds Should Prove Profitable

Bonds of electric railways, which can now be obtained on an attractive basis, afford an excellent opportunity for the intelligent investor. This is the opinion of D. F. Jordan of Halsey, Stuart & Company, expressed in an article contributed by him to the San Francisco *Examiner*. Mr. Jordan says it would be premature to say that the electric railways have generally re-established their pre-war earning status, but for those companies which operate in large cities under a favorable franchise, which enjoy cordial public relations and which are economically and capably managed he sees the outlook as encouraging.

Mr. Jordan said:

> A study of the situation in electric railway securities indicates that in certain companies improvement has progressed to a point which warrants favorable investment consideration.
>
> The difficulties which have confronted the industry for several years are too well known to require detailed comment. The competition of the passenger automobile and the bus, the handicap of a stationary 5-cent fare, and the burden of heavy increases in operating expenses have combined to affect adversely the corporate earnings.
>
> The extent to which these obstacles have been met and overcome to a large extent is not fully appreciated by the public generally or by investors.
>
> The competition of the passenger automobile and the bus was never so serious as might readily have been assumed from casual comment. The passenger automobile did harm to interurban traffic, but had limited effect upon city riding. Bus operation, save in outlying districts, has yet to prove more economical or serviceable than the trolleys. No major city rail operation has been suspended and buses substituted permanently for cars.
>
> Incidentally, the traction lines are carrying more passengers than ever before. Their chief difficulty has never been lack of traffic, but inadequacy of earning power. The handicap of a stationary fare has been a more serious problem. A 5-cent fare for a street car ride had become an American institution. The companies found it difficult to secure rate increases because of franchise restrictions and the general impression that lower operating costs were not far distant.
>
> Eventually, but unfortunately not before several companies were brought to the brink of receivership, relief came in the form of higher fares. The 5-cent fare has disappeared save in a few cities like San Francisco and New York, where exceptional conditions exist.
>
> In theory, the actual cost of service, large or small, should be covered, with a reasonable margin of profit based upon capital investment, by revenue rates set sufficiently high by the regulatory public commissions. In practice the companies find it more profitable to insure earnings by keeping down expenses than by seeking higher rates.
>
> Many economies have been put into effect, such as one-man cars, decrease of transfer abuse, cheaper power, elimination of unprofitable lines, substitution of buses where economical, reduction of paving obligations and more efficient equipment.

Mr. Jordan says that wages, however, the chief operating cost, remain high and will continue so under existing economic conditions, but that it should be carefully noted that anything approaching a depression in business will enhance rather than harm the position of the electric railways.

Property at Rome, Ga., Goes to Southeastern

Acquisition of the Rome Railway & Light Company, Rome, Ga., by the Southeastern Power & Light Company was announced on Sept. 3. The former company, which furnishes electric light, power and transit in Rome, Ga., and vicinity, was valued at about $2,000,000. As a result of this and other recent purchases Southeastern has brought under its control practically all utilities in Middle and North Georgia.

Passengers carried by Southeastern transit systems in July totaled 9,802,000, and those carried in the first seven months of the year totaled 68,780,585. Buses operated by Southeastern carried more than 2,500,000 passengers in the seven-month period.

More Moves in Kansas City Reorganization

William G. Woolfolk, president of the Kansas City Public Service Company, and Powell C. Groner, attorney for the company, on Sept. 2 submitted a formal request to the State Public Service Commission for the issuance of the latter body's formal order transferring the properties of the Kansas City Railways to the potential owners. They also sought permission to issue new securities as provided in the reorganization plan.

Frank P. Sebree, attorney for the holders of second mortgage bonds of the old company, is said to have entered objections to the commission's issuance of the order of transfer.

It is said that the filing of the report of John T. Harding, special master commissioner, fixes Dec. 1 as the limit in which the physical transfer of the railway may be made, and Mr. Woolfolk has expressed the belief that it will be possible to effect the transfer some time in October.

An extension of 12½ years of the old Jost franchise in Kansas City, Mo., so as to permit issuance of 30-year securities by the new owners is under consideration by the City Council, although an amendment, said also to be under consideration, would stipulate that the new company shall sell fifteen car tickets for $1.

On the other hand, Howard Payne, city clerk of Kansas City, Kan., was notified on Sept. 3 that the reorganization plan of the Wyandotte Railways, successor to the Kansas City Railways in that city and a subsidiary company of the Kansas City Public Service Company, potential owner of the old Kansas City Railways, had been approved by the Public Service Commission of Kansas. Simultaneously the commission authorized the issuance of $1,250,000 of first mortgage bonds to finance the property.

Through Mr. Woolfolk, president, and Mr. Groner, attorney for the Kansas City Public Service Company, the Wyandotte company on Aug. 17 applied to the Kansas commission for authority to consummate reorganization of the property in Kansas and for a certificate of convenience authorizing the issuance of the necessary securities.

Mr. Groner said the plans of the company included the re-establishment of service over the Twelfth Street viaduct to the Argentine district and that further extensions and improvements of service would be taken up for discussion with the city authorities immediately, when the property has been finally transferred to its purchasers by the federal court. Service over the viaduct has been eliminated since the reconstruction was begun in October, 1923. Mr. Woolfolk, however, is said virtually to have promised service over the bridge by Oct. 1 if the company's plans were approved soon by the Kansas commission.

No franchise for operation in Kansas City, Kan., has yet been applied for by the new company, but it is said that the city commissioners will demand the fulfillment of various obligations of the Kansas City Railways before a franchise will be granted the Wyandotte company.

Radial Lines Report Deficit

In a recent report the Hydro-Electric Power Commission of Ontario stated that the total deficit on all divisions of the York Radial Railways was $162,022 for the six months ended April 30. For the similar period last year the loss was $142,276, while two years ago it was $172,925. Revenue from the Scarboro and Mimico divisions was less than that returned last year, while on the Metropolitan it increased slightly.

Operating expenses were $366,669, while the income from the three divisions was $303,059. The deficit from operation shown is $63,609. To this is added interest to the extent of $93,237, and taxes to the amount of $5,175.

I.R.T. Directors Nominated

Herman A. Metz, former City Comptroller, was named on Sept. 8 by the Transit Commission to continue as a director representing the public on the board of the Interborough Rapid Transit Company, New York, N. Y., for a three-year term. Mr. Metz, head of large chemical enterprises and identified with milling and banking interests, already has served three years on the Interborough board and his re-election by the board is taken for granted.

Edward J. Berwind, Mortimer N. Buckner and Charles E. Dunlap were nominated for re-election as directors of the Interborough Rapid Transit Company by holders of Interborough voting trust certificates. Charles Day was nominated for re-election as a director representing the 5 per cent first and refunding mortgage bondholders. The annual meeting for the election of directors will be held Sept. 22.

Receiver Takes Management of Insolvent Road

Frederick W. Kruse, former Supreme Court Justice and member of the Appellate Division, named receiver for the Olean, Bradford & Salamanca Railway, Olean, N. Y., when it was declared insolvent, has taken up the duties of his new office.

The company was placed in the hands of a receiver as a result of action taken by Justice Thomas H. Noonan in Supreme Court in Buffalo.

Judgment creditors were represented by John K. Ward, attorney, Olean, formerly city attorney, and James P. Quigley, Olean attorney, appeared for the company. The State Tax Commission and the public were represented by Donald S. Dudley, deputy attorney-general.

It is the second time the property has gone into the hands of a receiver. The present company is a reorganization of the Western New York & Pennsylvania Traction Company.

Car Line Dismantled in Indiana.—Work has begun of tearing up the rails on the Normal City line of the Union Traction Company of Indiana, at Muncie, Ind. The line served one of the most populous parts of Muncie, the seat of the eastern division of the Indiana State Normal School. Two bus lines, one of them owned by the traction company, are now being operated between this section and the business district. Bus competition also caused the railway to abandon its Avondale line running to the southwestern part of the city. Traction buses are operating over that route. Only four car lines have been retained in service.

Would Abandon Portion of Line.—The Buffalo & Erie Railway, Fredonia, N. Y., filed on Sept. 7 a certificate of abandonment of that portion of its constructed road in the city of Lackawanna on Ridge Road between South Park Avenue and Abbott Road.

Quarterly Dividend Deferred by Indianapolis Railway.—The Indianapolis Street Railway, Indianapolis, Ind., has sent the following notice to preferred stockholders: "The expenditures found necessary to protect the company's property against the recent attacks of labor agitators and to restore normal transportation conditions, together with the constantly increasing use of privately owned automobiles and continued bus competition, were very fully considered at the last meeting of the board of directors and it was voted unanimously to defer the payment of the quarterly dividend on the preferred stock due Sept. 1, 1926."

Railway Placed Under Receivership.—The Denver & Interurban Railway, Denver, Col., known as the Kite Route, running between Denver and Boulder, was placed in the hands of a receiver on Sept. 2 by Federal Judge Robert E. Lewis of the United States Circuit Court of Appeals, acting as United States district judge at Denver. William H. Edmunds, general manager, was named receiver. This is the second time the road has been placed in the hands of a receiver. On June 12, 1918, Federal Judge J. A. Riner of Cheyenne, Wyo., sitting for Judge Lewis at Denver, ordered the road into the hands of a receiver on the application of the Guaranty Trust Company, New York, acting for the holders of bonds secured by a mortgage on the property. At that time the road was unable to pay interest on $1,000,000 indebtedness. Three years later Judge Lewis restored the road to its private management. The Kite Route is a subsidiary of the Colorado & Southern Railroad. Only recently the road officials placed buses in service as an aid to the electric line.

Book Review

Year Book American Engineering Standards Committee—1926

American Engineering Standards Committee, New York, N. Y. 75 pages.

Growth in the magnitude and savings resulting from standardization work are shown in the Year Book of the American Engineering Standards Committee just issued. More than 200 definite standardization projects are now in process or have been completed and 365 national trade associations, technical societies and government bureaus are co-operating in the work. All this has resulted in some 1,600 representatives co-operating.

For the convenience of those interested, the A.E.S.C. maintains a file of specifications, which are sold at cost. These include standards issued by all the foreign standardization bodies with which it regularly exchanges information and for those of all the national trade associations and technical societies in the United States which have issued standards and specifications. This is done as a means of co-operating in the important work represented in the National Directory of Commodity Specifications recently published by the Department of Commerce.

About 7,000 standards are available for examination and reference in the file of the A.E.S.C. This information service is of particular value to engineers in specifying various materials used. Of the projects studied during the past year, nine relate to transportation. Of these, six have been approved by the American Engineering Standards Committee.

The Year Book lists the member bodies, gives outstanding developments and work accomplished, explains the relation of the American Engineering Standards Committee to various associations and lists the individual standardization projects that are now under consideration and indicates the stage of development that has been reached. Rules of procedure for establishing American standards are given together with a list of co-operating bodies that are assisting in this standardization.

The Universal Directory of Railway Officials

The Directory Publishing Company, Ltd., London. 398 pages. $5 post free.

This is the 32d annual edition of the Universal Directory of Railway Officials, compiled from official sources under the direction of the editor of the *Railway Gazette*. The book gives, first, a list of railroad societies, associations and unions in the United Kingdom, with their officers; then tabulates the railroads themselves alphabetically under the various countries of the world, showing their complete organization; and lastly, an index of all the officials of the roads with cross-reference to the section in which the administration of their road is elaborated.

The Universal Directory will be found most useful in the offices of railroads having international interests, for no other publication contains a complete list of the officials of the principal roads all over the world.

McGraw-Hill Books

McGraw-Hill Book Company, Inc., New York, N. Y. 260 pages.

This is a complete catalog with a classified table of contents, authors' index and a subject index.

Blue Book of Southern Progress

Published by Manufacturers Record, Baltimore, 1926. 370 pages. Price 50 cents.

Owing to the great developments in the southern part of the United States there is a wider interest throughout the country in this section. The Blue Book of Southern Progress opens the door into realms of wonder, the work of Southern resources and Southern ingenuity. A survey of the South gives a birdseye view of the great achievements which are being performed by the people of the Southern communities. The 1926 issue of this book, largely the work of Richard H. Edmonds and Howard L. Clark, is designed to stimulate the Southern people themselves with a desire for a broader knowledge of their own region. The book is complete and more comprehensive than any other edition. A study of the development of every phase of Southern life is made. It includes such subjects as railroading in the South, agricultural development, manufacturing, building and construction, mineral expansion, with complete summaries of the country's economic progress, the South's economic progress and the economic progress of individual Southern states. Many pictures are included to enhance the interest.

Addresses by Preston S. Arkwright

Public Relations Department, Georgia Railway & Power Company, Atlanta, Ga. 386 pages.

Because his words of wisdom fell upon willing and anxious ears the addresses of Preston S. Arkwright have been put into book form as "a permanent record of his expressions upon public utility affairs." The president of the Atlanta property has been called upon on many occasions to speak before public gatherings on public utility subjects and his speeches cover a wide range. A cursory glance at the table of contents shows his versatility and adaptability, while his ideas on creating company spirit and courting public favor are worthy of the attention and assimilation of railway magnates. In publishing the book the public relations department of the Georgia Railway & Power Company hopes it will increase the employees' "pride in their vocation and stimulate greater enthusiasm in the principles of public utility service."

Personal Items

G. C. Whitney with Commission

Assistant Signal Engineer of Brooklyn Company Takes Similar Post with New York Body

Gilbert C. Whitney, formerly assistant engineer with the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., has been appointed to the newly created position of signal engineer with the State of New York Transit Commission. Mr. Whitney is personally responsible for several modern advances in the railway signaling art, among which are to be found basic studies and patents in color-light signal design; automatic track circuit control of power-operated switches which also provides positive approach and route locking independent of the switch and signal operating levers; the induction circuit controller for the reversible control of electric circuits without contacts; the Whitney indication system installed on the lines of the Brooklyn-Manhattan Transit Corporation, which provides continuous indication of train position, train movement and motor-operating characteristics, and also provides a continuous index as to the condition of insulated joints and detects local defects in the propulsion current return system and without contacts or moving parts, and more recently the reversible control of signal circuits without contacts or moving parts.

UNDERWOOD & UNDERWOOD

G. C. Whitney

Mr. Whitney received his early training in the public, high and state normal schools at North Adams and the Buffalo Technical High School. After a very broad practical training in the electrical and mechanical arts, obtained in part with the General Electric and New England telephone and telegraph companies, he entered the railway signal field in 1905 at the Buffalo factory of the General Railway Signal Company and was employed on manufacture, assembly, test, field installations, estimates and engineering until 1909.

He then entered the employ of the New York Central Railroad in the electric zone and there was concerned with signal repairs, maintenance, drafting, circuit design and estimates until 1912, when he became assistant engineer with H. S. Balliet, assistant terminal manager and signal engineer. From 1917 to 1918 he was employed by J. M. Waldron, signal engineer of the Interborough Rapid Transit Company, chiefly on scientific signaling studies and circuit design. From 1918 until his recent appointment he has been assistant engineer with R. C. Johnson, signal engineer of the Brooklyn-Manhattan Transit Corporation on the development, installation and maintenance of signals on the elevated and subway lines in New York and Brooklyn. Mr. Whitney was born April 9, 1883, at North Adams, Mass.

A. J. Schulthess Superintendent at Spokane

Appointment of A. J. Schulthess as general superintendent of the Spokane United Railways, Spokane, Wash., was announced on Sept. 1 by M. W. Birkett, vice-president and general manager. Mr. Schulthess will be the operating head of the United system to replace the late R. A. Willson, assistant general manager, who died in August. He joined the staff of the Spokane Traction Company in 1904 and has been active in railway work in Spokane for 22 years. He was employed by the Washington Water Power Company in 1910 and has been assistant to Mr. Willson since that time. At the time of the consolidation of the railways in Spokane in 1922 he was made superintendent of properties and his promotion at this time includes the position of manager of Natatorium Park, owned by the United.

Frederick Krug, formerly superintendent of power production of the Porto Rico Railway, Light & Power Company, San Juan, Porto Rico, has recently been appointed assistant to C. C. Giles, who is now president of that company as well as of the Porto Rico Railways Company, Ltd., the holding company. Mr. Krug has been affiliated with the Porto Rico properties since 1922, when he became superintendent of the La Plaza hydro-electric plant of the Porto Rico Railway, Light & Power Company. He had formerly served as assistant superintendent of the electrical department of the New York-Honduras-Rosario Mining Company.

J. K. B. Hare, formerly in charge of syndicate public utility sales for the Pittsburgh district of the Westinghouse Company, has been appointed manager for the company at Columbus, Ohio. Mr. Hare has been employed with the Westinghouse Company since 1912. He first enrolled in the employ of the Westinghouse Air Brake Company as a draughtsman, and later entered the sales department, serving in the Chattanooga district.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Exports of Electrical Goods Increase in June

Exports of electrical goods from the United States during June, 1926, totaled $8,591,570, an increase of $2,650,760, or more than 44 per cent above those of June, 1925, and an increase of $1,165,670 when compared with May, 1926. It was the third highest month since May, 1921, being exceeded only by April, 1926, which reached $9,070,500, and December, 1925, which totaled $8,808,600. These figures were published by the United States Department of Commerce, Bureau of Foreign and Domestic Commerce.

Exports of electrical equipment of particular application to electric railway usage for the months of June in each year were as follows:

	June, 1925	June, 1926
Direct-current generators...	46,652	102,348
Alternating - current generators	81,532	174,728
Storage batteries	198,921	278,535
Transforming or converting apparatus	310,818	290,566
Transmission and distribution apparatus	414,181	559,265
Railway motors	21,619	86,139
Electric locomotives	22,497	72,227
Railway signals, switches and attachments	77,094	32,485
Copper bare wire..........	114,952	294,037

Goldschmidt Thermit Receives Another Federal Decree

A final decree for an injunction has just been issued by the United States District Court for the Western District of Missouri against the Liquid Steel Welding Corporation, Anton Lucas and others of Kansas City, Mo., in a suit for infringement of patents brought by the Goldschmidt Thermit Company, a subsidiary of the Metal & Thermit Corporation of New York City. The suit involved the same three patents which were at issue in the suit of the Goldschmidt Thermit Company against the Alumino Thermic Corporation of Roselle Park, N. J., and others in which a decision was recently rendered by the U. S. District Court of New Jersey, Judge Bodine presiding, in favor of the same plaintiffs. The Liquid Steel Welding Corporation of Kansas City is reported to have ceased its operations and permanently closed its plant.

Personnel Changes in General Body Company

W. M. Peters has assumed control of the sales organization of the General Body Company of Defiance, Ohio. Richard McCrackin has been made manager of the company's plant. Manufacture will be continued of the "Miller Built" line of bus bodies and in addition the company will furnish commercial bodies and a full line of cabs.

The General Body Company is operating the plant formerly occupied by the Trumbull Wagon Works Company and has in excess of 100,000 sq.ft. of manufacturing space, of which 75,000 is in the main building. The mill room has a capacity of approximately 10,000 ft. of finished stock per day. Power is furnished from the company's own plant, which supplies both steam and electric power.

Considerable foreign business is anticipated by the company due to its long experience in building and preparing bodies and buses for foreign shipment. This will, of course, be in addition to the domestic trade. Mr. Peters, the new sales manager, was for several years with the White Company before forming his present affiliations.

Outside Exhibits Banned at Cleveland

Director of Exhibits Fred Dell, who is in charge of the big show to be staged by the American Electric Railway Association at Cleveland, Oct. 4-8, again wishes to call attention to the action of the executive committee in barring exhibits or demonstrations elsewhere than in the spaces provided for such purposes in the buildings and grounds of the convention. The text of the committee's resolution bearing on this matter was published on page 604 of the issue of ELECTRIC RAILWAY JOURNAL for April 3, 1926.

Arrange Inspection Trips After Noon, Friday, Oct. 8

All manufacturers in the Cleveland territory who are planning inspection trips to their plants and other forms of entertainment for convention delegates are asked by the executive committee to abide by the plan of scheduling all such affairs following the close of the regular convention program. By noon on Friday, Oct. 8, all meetings will be over and the inspection of exhibits terminated so that inspection trips held after that time will receive the undivided attention of delegates. In return for co-operation in this program it is planned to give full information on all scheduled inspection trips in the official program of the convention.

Rail Cars May Now Operate on Distillate

Delivery is now being made of ten additional gas-electric cars for the Boston & Maine Railroad. They are being built by the Osgood-Bradley Car Company, Worcester, Mass. The electrical equipment is furnished by the General Electric Company and the gasoline and distillate burning engine by the Winton Engine Company of Cincinnati, Ohio. These are the first rail cars in the country to employ distillate as a fuel in the prime mover. The special carburetor which makes possible the change-over from gasoline to distillate when the engine is turning over at approximately 400 r.p.m. is installed on the cars by the Electro-Motive Car Company, although it is not manufactured by that concern.

Eight of the new rail cars are to be 61 ft. in over-all length, while the remaining two will be 73 ft. long. The generator and power plant on each car are the same, being capable of 275 hp. at 1,000 r.p.m. The engine burns gasoline at low speeds and distillate at the higher speeds, the point of change-over being governed by the position of a

One of the Two 73-Ft. Rail Cars Just Delivered to the Boston & Maine Railroad damper in the carburetor. It is necessary only to carry 50 gal. of gasoline in a small auxiliary tank, while the main fuel tank of course contains distillate. The cars are designed to operate with an auxiliary trailer coach and will be placed in service for light traffic handling on various of the Boston & Maine lines. The railroad will have sixteen rail cars which embody the electric drive feature when all of the present order have been delivered. It is estimated that from 30 to 50 per cent saving in fuel costs will be effected with the new distillate-burning feature.

Distribution to Be Discussed at Congress of American Industry

One of the major phases of economics to be considered at the Congress of American Industry being held at Philadelphia, Sept. 7 to 24, is the distributor as a factor in American life and business.

In this connection it has been announced that Albert L. Salt, president of the Graybar Electric Company, will address the congress and describe in detail the function and significance of twentieth century distribution methods in their relation to the producer and consumer.

Chicago & Joliet Cars Built by Cummings

In a brief description of the ten new interurban cars which have been built for the Chicago & Joliet Electric Railway of Joliet, Ill., which was published on page 368 of the issue of ELECTRIC RAILWAY JOURNAL for Aug. 28, no mention was made of the fact that the cars were constructed by the Cummings Car & Coach Company. They were built in the works of that company at Paris, Ill., and embody the latest designs for interurban service. Four of the cars have a seating capacity of 48, while the remainder will accommodate 52 passengers.

New Ohio Brass Catalog

Some changes in the order of presentation have been made in the trolley materials section of the new No. 20 O-B general catalog now being distributed by the Ohio Brass Company, Mansfield, Ohio. Electric railway operators will find such products presented in a very convenient manner. Included in this grouping, as well as in the rail bond section, are a number of new products developed and offered to electric railways since the last edition of the catalog. The books are carefully indexed and cross-references are plentiful.

This book of 945 pages, exceeding the previous edition by 175 pages, includes complete listing of all O-B porcelain insulators, trolley and line materials, rail bonds, car equipment and mining materials. It is logically divided and thumb-indexed for the well-defined classes of products of this company. In addition to descriptive and listing information, there are many helpful suggestions for the man concerned with the installation work.

Metal, Coal and Material Prices

Metals—New York	Sept. 7, 1926
Copper, electrolytic, cents per lb.	14.35
Copper wire, cents per lb.	16.25
Lead, cents per lb.	8.875
Zinc, cents per lb.	7.77
Tin, Straits, cents per lb.	67.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.425
Somerset mine run, Boston, net tons	1.975
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.575
Central, Ill., screenings, Chicago, net tons	1.50
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.00
Weatherproof wire base, N.Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.8
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.25
Turpentine (bbl. lots), N. Y., per gal.	$0.96

Trim Should Have Been Haskelite

In publishing the list of principal specifications on the new street cars for the Gary Railway, Gary, Pa., which appeared in the issue of ELECTRIC RAILWAY JOURNAL for Aug. 7, an error was made in stating the specifications for interior trim. Haskelite was used for interior trim instead of the mahogany which was specified.

Track and Line

United Electric Railways, Providence, R. I., will double track the highway over the entire length of the proposed improvements being made by the city. The single track on Smith Street between Elmhurst and Oakland Avenue is being removed.

Trenton & Mercer County Traction Corporation, Trenton, N. J., will install a loop at State and Olden Avenues and lay a single track in Wilmer Alley.

Portland Electric Power Company, Portland, Ore., has asked the City Council for a franchise to construct, maintain and operate railway tracks over the new Vista Avenue viaduct, now being built. The viaduct is about two-thirds completed.

Power Houses, Shops and and Buildings

Ontario Hydro-Electric Railway, Windsor, Ont., is building a converter station at McDougall Avenue and Erie Street, Windsor. The building, which will be of brick and concrete construction, will be equipped with three 1,000-kw. converters, receiving current at 13,000 volts, a.c., and converting it to 600 volts, d.c. It will be ready for operation about Oct. 1.

Boston Elevated Railway, Boston, Mass., has sold nearly all of the land with buildings comprising the Grove Hall carhouse site of more than four acres. About one-fifth of an acre with an emergency truck garage has been retained. The garage was constructed during 1920 and 1921. There have been and are several buildings on the property. Facing on Blue Hill Avenue was formerly a large frame and brick carhouse, the frame part of which was erected in 1890 by the West End Street Railway. The brick part was a stable belonging to the Highland Street Railway. In 1922 the front area of the carhouse was reduced by nearly an acre. The property also contains substantial buildings formerly used for carhouse purposes and shops.

Trade Notes

Oakite Products, Inc., is the new name recently adopted by what was formerly the Oakley Chemical Company. The general offices are located at 22 Thames St., New York, while the factory continues as heretofore in Bush Terminal, Brooklyn, N. Y. Since 1909 the company has manufactured Oakite industrial cleaning materials. The personnel of the management and the field organization will remain the same under the new name.

American Brown Boveri Electric Corporation, New York, N. Y., announces the opening of a Boston office and the appointment of George M. Bates as district manager. The New England sales office is located at 842 Summer Street, Boston, Mass. Mr. Bates was with the New England sales force of the Westinghouse Electric & Manufacturing Company for 28 years, prior to accepting his latest appointment. He was a graduate of Tufts College in 1893, receiving the degree of B.E.E. After taking the student course with the Westinghouse company he was associated with the West End Street Railway and later the Boston Elevated in Boston, Mass. He joined the sales force of the Westinghouse Electric & Manufacturing Company in 1898.

New Advertising Literature

Roller-Smith Company, New York, N. Y., has issued bulletins 110 and 150 describing respectively its new type HTD direct-current and HTA alternating-current portable ammeters, voltmeters, volt-ammeters and single-phase wattmeters. The instruments are stated to be small enough for the pocket, tool kit or traveling bag, sufficiently accurate for all ordinary tests and light in weight.

General Electric Company, Schenectady, N. Y., has issued bulletin GEA-394 containing information on induction motor-generator sets with capacities from 1 to 35 kw. and for use at 125 or 250 volts.

American Car & Foundry Company, New York, N. Y., has issued the first two of a series of folders disclosing the reasons which actuated the company in taking over the active production of motor bus equipment and in selecting the Hall-Scott engine and the Fageol Safety Coach to uphold its standards in this field.

Electric Service Supplies Company, Philadelphia, Pa., has issued a 200-page catalog covering a complete listing of bus equipment for the motor bus industry. The book, known as Catalog 9, contains a brief description of specialties adapted for use on buses of either the gasoline or trackless trolley type. Many diagrams and illustrations accompany the text and a list number index and material index are included to facilitate handy reference.

and now—

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In the intensive curriculum of the training school for platform-men of the Third Avenue Railway System, New York City, Peacock Staffless Brakes are included as an important part of the equipment. The men are trained in the proper use of both air and hand brakes by efficient instructors. And a rule of this system is that the hand brakes on each car must be applied at least once on every trip!

Peacock Staffless Brakes are modern in every particular; low installation and maintenance costs; simplicity of operation; minimum platform space; develop three times the braking capacity of ordinary hand brakes; 144-in. chain winding capacity insuring adequate braking power even though brake shoes are worn and brake rigging is loose.

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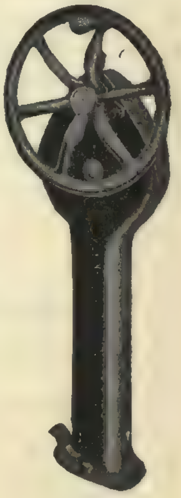

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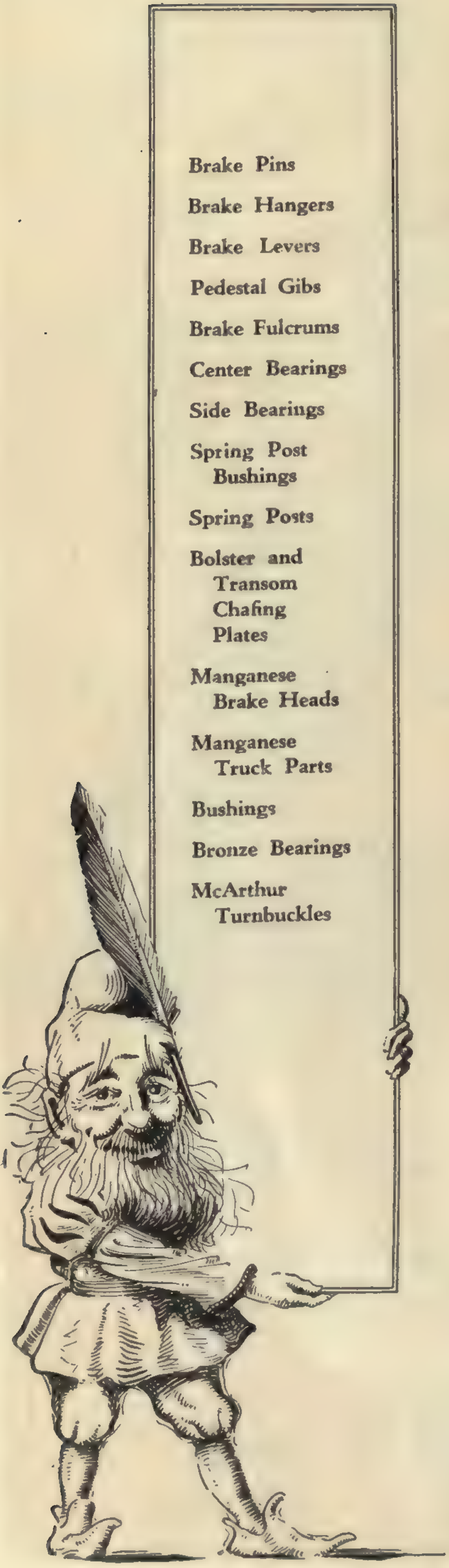

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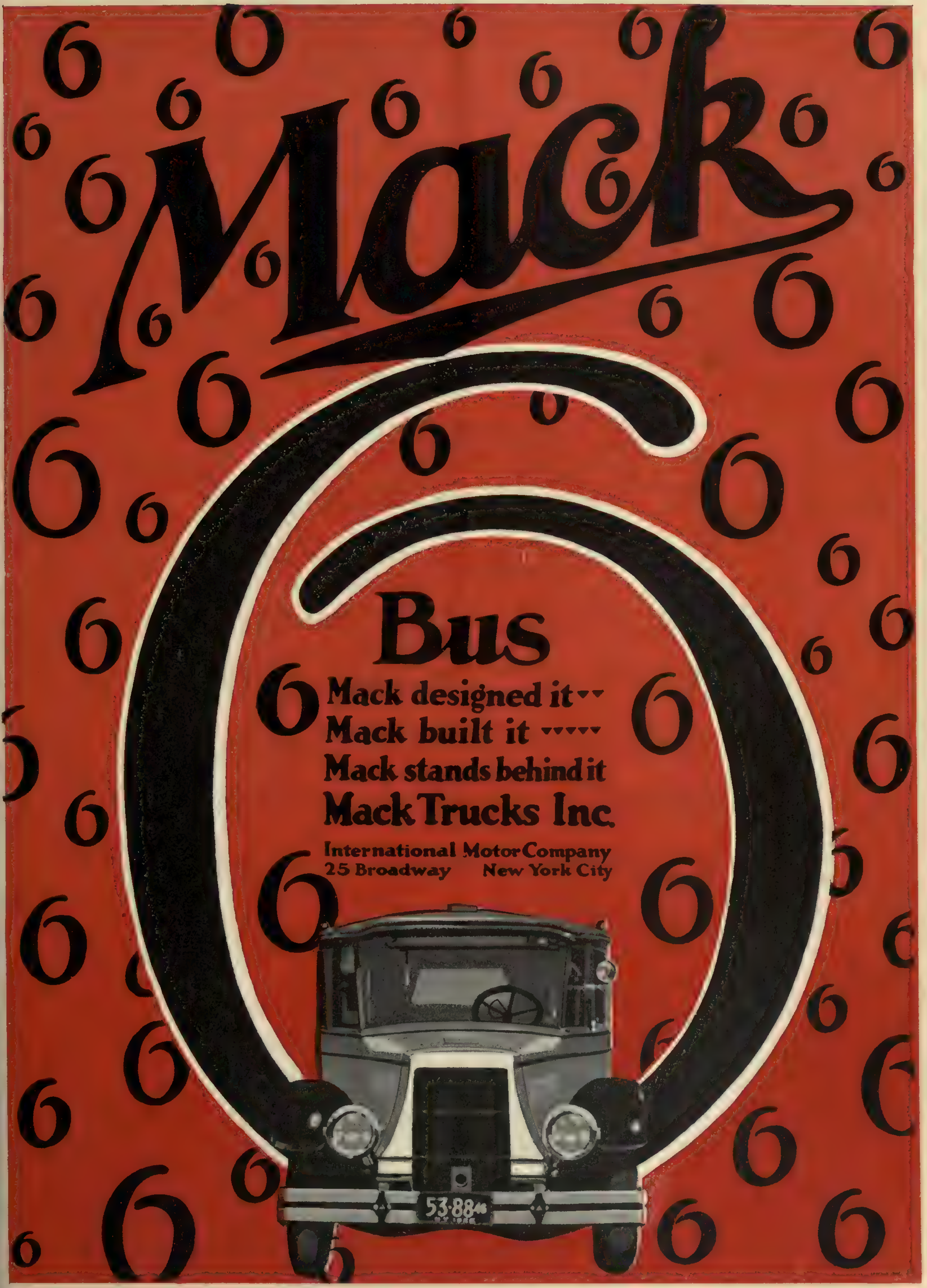

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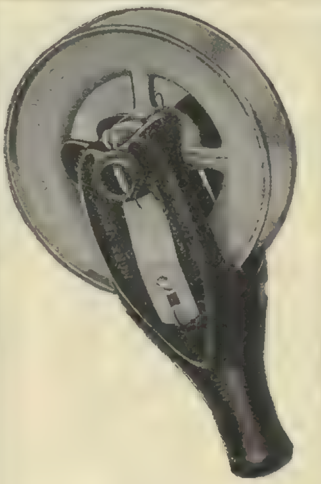

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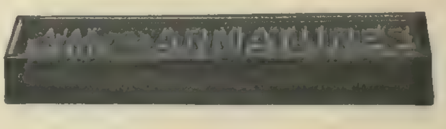

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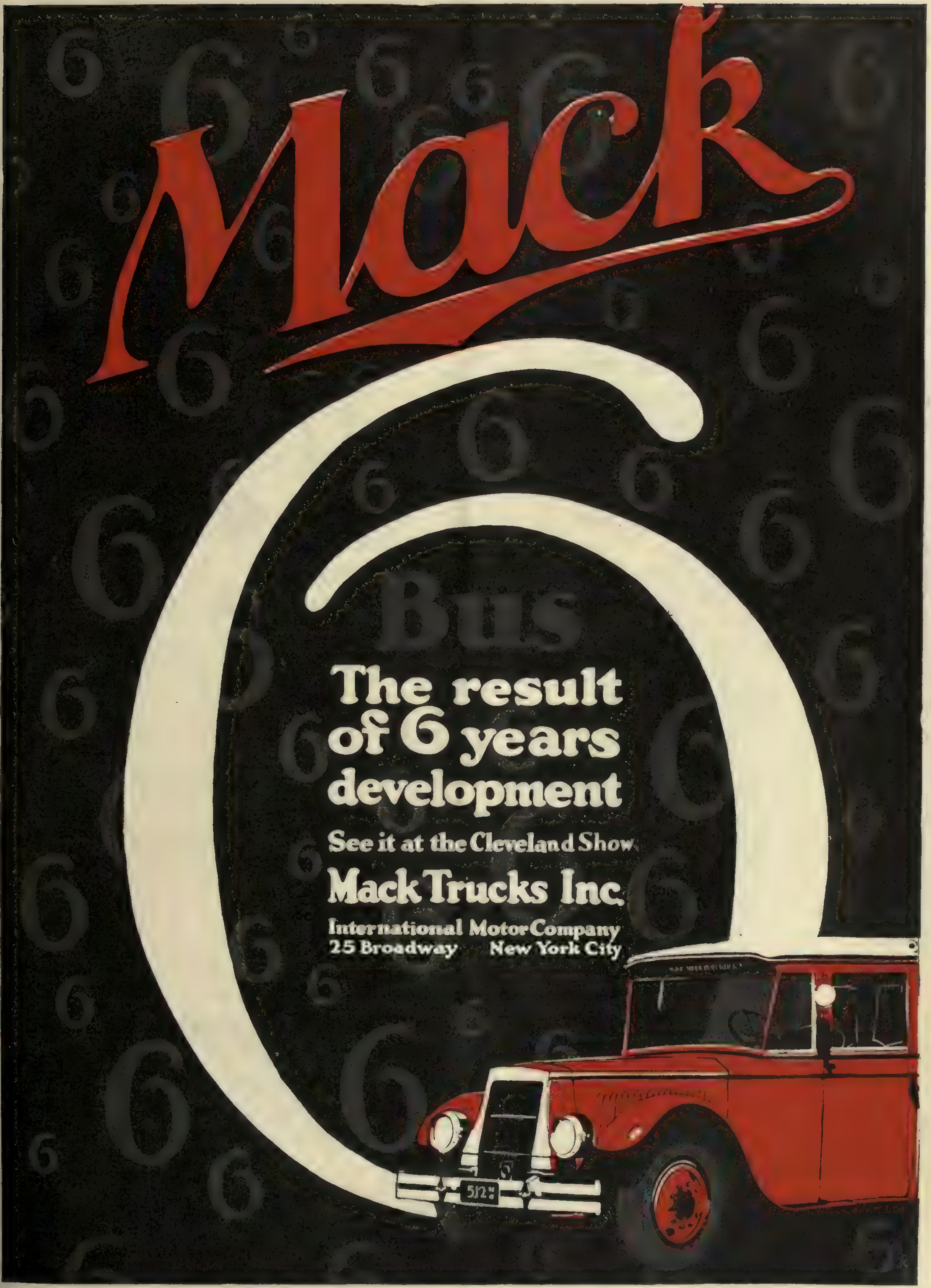

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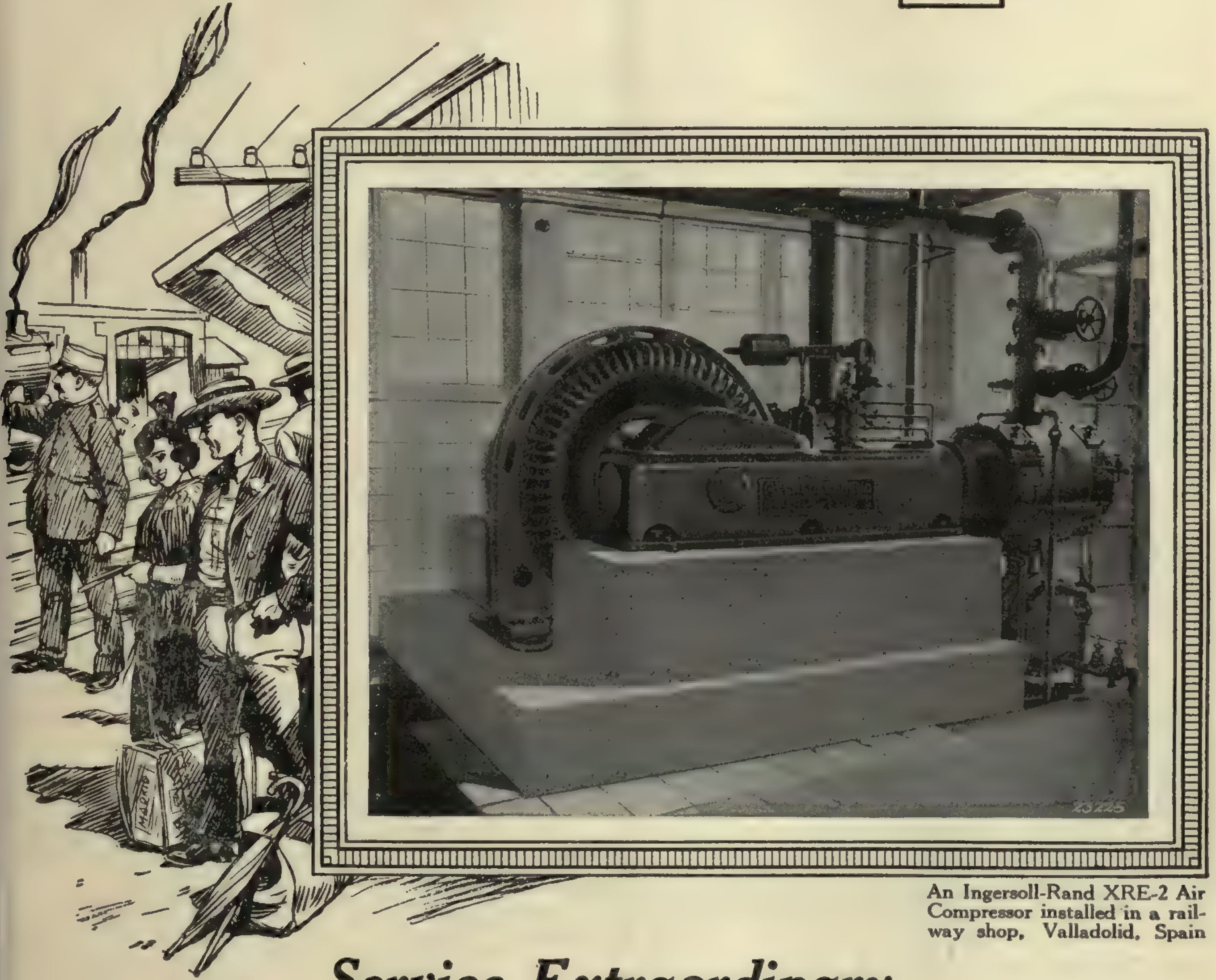
(Continued on page 40)



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Insulating Varnishes
- Irvington Varnish and Insulator Co.

Insulation (See also Paints)
- Electric Ry. Equipment Co.
- Elec. Service Supplies Co.
- General Electric Co.
- Irvington Varnish & Ins. Co.
- Okonite Co.
- Okonite-Callender Cable Co.
- Westinghouse E. & M. Co.

Insulation Slots
- Irvington Varnish & Ins. Co.

Insulator Pins
- Elec. Service Supplies Co.
- Hubbard & Co.

Insulators (See also Line Materials)
- Elec. Ry. Equipment Co.
- Elec. Service Supplies Co
- General Electric Co.
- Graybar Electric Co.
- Irvington Varnish & Ins. Co.
- Ohio Brass Co.
- Westinghouse E. & M. Co.

Interior Side Linings
- Haskelite Mfg. Corp.

Interurban Cars (See Cars)

Jacks (See also Cranes, Hoists and Lifts)
- Buda Co.
- Elec Service Supplies Co.
- National Ry. Appliance Co.

Joints, Rail (See Rail Joints)

Journal Boxes
- Bemis Car Truck Co.
- Brill Co., The J. G.

Lamp Guards & Fixtures
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
- General Electric Co.
- Westinghouse E. & M. Co.

Lamps, Signal and Marker
- Electric Service Supplies Co
- Ohio Brass Co.

Letter Boards
- Haskelite Mfg. Corp.

Lightning Protection
- Elec. Service Sup. Co.
- General Electric Co.
- Ohio Brass Co.
- Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
- Archbold-Brady Co.
- Electric Ry. Equipment Co.
- Electric Service Supplies Co.
- General Electric Co.
- Graybar Electric Co.
- Hubbard & Co.
- More-Jones Brass & Metal Co.
- Ohio Brass Co.
- Westinghouse E. & M. Co.

Locking Spring Boxes
- Wm. Wharton, Jr. & Co..

Locomotives, Electric
- American Brown Boveri Elec. Corp.
- General Electric Co.
- Westinghouse E. & M. Co.

Locomotives, Oil Engine Electric Driven
- Ingersoll-Rand Co.

Lubricating Engineers
- Universal Lubricating Co.

Lubricants, Oil and Grease
- Universal Lubricating Co.

Manganese Parts
- Bemis Car Truck Co.

Manganese Steel Guard Rails
- Ramapo Ajax Corp.
- Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
- Bethlehem Steel Co.
- Wm. Wharton, Jr. & Co..

Manganese Steel Switches, Frogs & Crossings
- Bethlehem Steel Co.
- Ramapo Ajax Corp.
- Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Motor and Generator Sets
- General Electric Co.

Motor Buses (See Buses, Motor)

Motor Generators
- American Brown Boveri Elec. Corp.

Motors and Controls
- Graybar Electric Co

Motors, Electric
- American Brown Boveri Elec. Corp.
- General Electric Co.
- Westinghouse E. & M. Co.

Motorman's Seats
- Brill Co., The J. G.
- Electric Service Supplies Co.
- Wood Co., Chas. N.

Nuts and Bolts
- Bemis Car Truck Co.
- Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

Oxygen
- International Oxygen Co.

Packing
- Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
- Electric Service Supplies Co.
- Irvington Varnish & Ins. Co.

Paints and Varnishes for Woodwork
- National Ry. Appliance Co.

Panels, Outside, Inside
- Haskelite Mfg. Corp.

Pavement Breakers
- Ingersoll-Rand Co.

Pickup, Trolley Wire
- Elec. Service Supplies Co.
- Ohio Brass Co.

Pinion Pullers
- Elec. Service Supplies Co.
- General Electric Co.
- Wood Co., Chas. N

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
- Bemis Car Truck Co.
- Ohio Brass Co.
- Westinghouse Tr. Brake Co.

Pipe Fittings
- Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
- Ramapo Ajax Corp.

Pliers, Rubber Insulated
- Elec. Service Sup. Co.
- Nat'l Ry. Appliance Co.

Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
- Haskelite Mfg. Corp.

Pneumatic Tools
- Ingersoll-Rand Co.

Pole Line Hardware
- Bethlehem Steel Co.
- Electric Service Supplies Co
- Ohio Brass Co.

Pole Reinforcing
- Hubbard & Co.

Poles, Metal Street
- Elec. Ry Equipment Co.
- Graybar Electric Co.
- Hubbard & Co.

Poles and Ties Treated
- Bell Lumber Co.

Poles, Ties, Posts, Piling & Lumber
- Bell Lumber Co.
- Naugle Pole & Tie Co.

Poles, Trolley
- Bell Lumber Co.
- Electric Service Supplies Co.
- Nuttall Co., R. D.

Poles, Tubular Steel
- Elec. Ry. Equipment Co.
- Electric Service Supplies Co.

Portable Grinders
- Buda Co.

Potheads
- Okonite Co.
- Okonite-Callender Cable Co., Inc.

Power Saving Devices
- National Ry. Appliance Co.

Pressure Regulators
- General Electric Co.
- Ohio Brass Co.
- Westinghouse E. & M. Co.
- Westinghouse Traction Brake Co.

Pumps
- A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
- Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)

Pumps, Vacuum
- A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
- Ingersoll Rand Co. (A. S. Cameron Steam Pump Wks.)

Punches, Ticket
- International Register Co.
- Wood Co., Chas. N.

Rail Braces & Fastenings
- Ramapo Ajax Corp.

Rail Filler
- Philip Carey Co., The

Rail Grinders (See Grinders)

Rail Joints
- Carnegie Steel Co
- Rail Joint Co., The

Rail Joints—Welded
- Lorain Steel Co.
- Metal & Thermit Corp.

Rail Welding
- Metal & Thermit Corp.
- Railway Trackwork Co.
- Una Welding & Bonding Co.

Rails, Steel
- Carnegie Steel Co.

Rail Welding
- Metal & Thermit Corp.
- Railway Trackwork Co.
- Una Welding & Bonding Co.

Railway Safety Switches
- Consolidated Car Heating Co.
- Westinghouse E. & M. Co.

Rattan
- Brill Co., The J. G.
- Elec. Service Supplies Co.
- Hale-Kilburn Co.

Rectifiers, Mercury
- American Brown Boveri Elec. Corp.

Registers and Fittings
- Brill Co., The J. G.
- Cincinnati Car Co.
- Electric Service Supplies Co.
- International Register Co.

Reinforcement, Concrete
- American Steel & Wire Co.
- Bethlehem Steel Co.
- Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
- Elec. Service Supplies Co.

Repair Work (See also Coils)
- General Electric Co.
- Westinghouse E. & M. Co.

Replacers, Car
- Electric Service Supplies Co.

Resistances
- Consolidated Car Heating Co.

Resistance, Wire and Tube
- American Steel & Wire Co.
- General Electric Co.
- Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
- General Electric Co.
- Westinghouse E. & M. Co.

Roofing, Car
- Haskelite Mfg. Corp.
- Pantasote Co., Inc.

Roofs, Car and Bus
- Haskelite Mfg. Corp.

Safety Control Devices
- Safety Car Devices Co.

Sanders, Track
- Brill Co. The J. G
- Electric Service Supplies Co.
- Ohio Brass Co.

Sash Fixtures, Car
- Brill Co., The J. G.

Sash Metal Car Window
- Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
- Electric Service Supplies Co.

Seating Materials
- Brill Co., The J. G.
- Haskelite Mfg. Corp.
- Pantasote Co., Inc.

Seats, Bus
- Brill Co., The J. G.
- Hale-Kilburn Co.

Seats, Car (See also Rattan)
- Brill Co The J. G.
- Hale-Kilburn Co.

Second Hand Equipment
- Electric Equipment Co
- Perrey, Buxton Doane Co.
- Public Service Electric & Gas Co.
- Salzberg, Inc., H. E.

Shades, Vestibule
- Brill Co., The J. G.

Shovels
- Brill Co., The J. G.
- Hubbard & Co.

Shovels, Power
- Brill Co., The J. G.

Side Bearings (See Bearings, Center and Side)

Signals, Car Starting
- Consolidated Car Heating Co.
- Electric Service Supplies Co.
- Nat'l Pneumatic Co., Inc.

Signal Systems, Block
- Electric Service Supplies Co.
- Nachod and United States Electric Signal Co.
- Wood Co., Chas. N.

Signal Systems, Highway Crossing
- Nachod and United States Electric Signal Co.
- Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
- Elec. Ry. Equipment Co.
- Elec. Ry. Improvement Co.
- Elec. Service Supplies Co.
- More-Jones Brass & Metal Co.
- Nuttall Co., R. D.

Snow-Plows, Sweepers and Brooms
- Brill Co., The J. G.
- Consolidated Car Fender Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
- Irvington Varnish & Ins. Co.

Special Trackwork
- Bethlehem Steel Co.
- Lorain Steel Co
- Wm. Wharton, Jr. & Co.

Spikes
- Amer. Steel & Wire Co.

Splicing Compounds
- Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
- American Steel Foundries
- American Steel & Wire Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.

Sprinklers, Track and Road
- Brill Co., The J. G.

Steel and Steel Products
- Carnegie Steel Co.
- Illinois Steel Co.
- Morton Manufacturing Co.

Steel Car Doors
- Morton Mfg. Co.

Steel Flooring
- Morton Mfg. Co.

Steps, Car
- Brill Co., The J. G.
- Morton Mfg. Co.

Stokers, Mechanical
- Babcock & Wilcox Co.
- Westinghouse E. & M. Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
- Electric Service Supplies Co
- Ohio Brass Co.
- Westinghouse E. & M. Co.

Strand
- American Steel & Wire Co.
- Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express)

Superheaters
- Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
- Ramapo-Ajax Corp.

Switches and Switchboards
- American Brown Boveri Elec. Corp.
- Consolidated Car Heating Co.
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse E. & M. Co.

Switches, Tee Rail
- Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
- Ingersoll-Rand Co.
- Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
- Ramapo Ajax Corp.

Telephones and Parts
- Elec. Service Supplies Co.
- Graybar Electric Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
- Consolidated Car Heating Co.
- Gold Car Heating & Lighting Co.
- Railway Utility Co.
- Smith Heater Co., Peter

Ticket Choppers and Destroyers
- Electric Service Supplies Co.

Ties and Tie Rods, Steel
- Carnegie Steel Co.
- International Steel Tie Co.

Ties, Mechanical
- Dayton Mechanical Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tongue Switches
- Wm. Wharton, Jr. & Co..

Tools, Track & Miscellaneous
- American Steel & Wire Co.
- Electric Service Supplies Co
- Hubbard & Co
- Railway Trackwork Co.

Torches, Acetylene (See Cutting Apparatus)

Towers and Transmission Structures
- Archbold-Brady Co.
- Westinghouse E. & M. Co.

Track Grinders
- Metal & Thermit Corp.
- Railway Trackwork Co.
- Ramapo Ajax Corp.

Track, Special Work
- Buda Co.
- Ramapo Ajax Corp.

Trackless Trolley Cars
- Brill Co., The J. G.

Transformers
- American Brown Boveri Elec. Corp.
- General Electric Co.
- Graybar Electric Co.
- Westinghouse E. & M. Co.

Treads, Safety, Stair, Car Step
- Morton Mfg. Co.

Trolley Bases
- General Electric Co
- More-Jones Brass & Metal Co.
- National Railway Appliance Co.
- Nuttall Co., R. D.
- Ohio Brass Co.

Trolley Bases, Retrieving
- General Electric Co.
- National Railway Appliance Co.
- Nuttall Co., R. D.
- Ohio Brass Co.

Trolley Buses
- Brill Co., The J. G
- General Electric Co
- Westinghouse E. & M Co

Trolley Material, Overhead
- Electric Service Supplies Co
- More-Jones Brass & Metal Co.
- Ohio Brass Co.
- Westinghouse E. & M Co

Trolley Wheel Bushings
- More-Jones Brass & Metal Co.
- Star Brass Works

Trolley Wheels & Harps
- Electric Service Supplies Co.
- More-Jones Brass & Metal Co.
- Star Brass Works

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
- Amer. Electrical Works
- Amer. Steel & Wire Co.
- American Brass Co.
- Anaconda Copper Min. Co
- Graybar Electric Co.
- Roebling's Sons Co., J. A

Trucks, Car
- Brill Co., The J. G
- Bemis Car Truck Co.
- Cincinnati Car Co.

Trucks, Motor
- Graham Bros.
- International Motor Co
- Mack Trucks, Inc.

Truss Planks
- Haskelite Mfg. Corp

Tubing, Yellow & Black Flexible Varnish
- Irvington Varnish & Ins Co.

Turbines, Steam
- General Electric Co
- Westinghouse E. & M. Co.

Turnstiles
- Electric Service Supplies Co
- Perey Mfg. Co., Inc.

Turntables
- Electric Service Supplies Co.

Valves
- Ohio Brass Co.
- Westinghouse Tr Br Co

Varnished Papers & Silks
- Irvington Varnish & Ins. Co.

(Continued on page 42)

Our advertisement in the issue of August 21 showed how

HASKELITE and PLYMETL

are being used in reconstructed cars.

Another ad will appear next week.

HASKELITE MANUFACTURING CORPORATION
133 W. Washington St., Chicago, Ill.

Hale and Kilburn SEATS

Better Quality Seats
For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

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Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.

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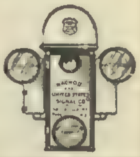
NACHOD & UNITED STATES SIGNAL CO., INC.

LOUISVILLE, KY.

BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS


NACHOD AND UNITED STATES SIGNAL CO

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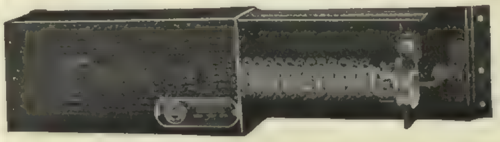
Use them in your Prepayment Areas and Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED



No. 478E

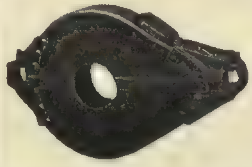
GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.

PS HEATERS

Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.



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Seamless—Rivetless—Light Weight
Best for Service—Durability and Economy. *Write Us.*

Chillingworth Mfg. Co.
Jersey City, N. J.

STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

UNA

RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio

RAIL GRINDERS AND WELDERS

Railway Track-work Co., Philadelphia

682

RAILWAY UTILITY COMPANY

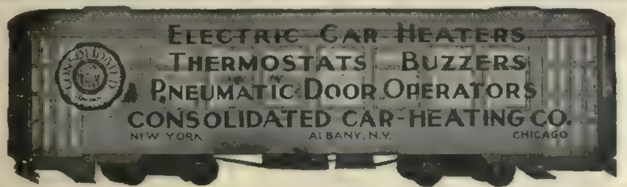
CAR COMFORT WITH **UTILITY**

HEATERS
REGULATORS
VENTILATORS

141-151 West 22d St.
Chicago, Ill.

Write for Catalogue

1328 Broadway
New York, N. Y.



ELECTRIC CAR HEATERS
THERMOSTATS BUZZERS
PNEUMATIC DOOR OPERATORS
CONSOLIDATED CAR-HEATING CO.
NEW YORK ALBANY, N.Y. CHICAGO

Eliminate rail joints
by
THERMIT-WELDING

METAL & THERMIT CORPORATION
120 Broadway, New York City. N.Y.

SEVEN WORKS
RAMAPO-AJAX-ELLIOT

HILLBURN, NEW YORK
NIAGARA FALLS, N.Y.
CHICAGO, ILLINOIS
EAST ST. LOUIS, ILL.
PUEBLO, COLORADO
SUPERIOR, WISCONSIN
NIAGARA FALLS, ONT. CANADA

Ramapo Ajax Corporation

RAMAPO AUTOMATIC RETURN SWITCH STANDS FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
MANGANESE CONSTRUCTION
SALES OFFICES AT ALL WORKS
Main Office, HILLBURN, N.Y.

H B LIFE GUARDS

PROVIDENCE FENDERS

Manufactured by
CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.

General Sales Agents
WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. C.

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Consolidated Car Heating Co.
Natl. Ry. Appliance Co.
Railway Utility Co.

Vestibule Linings
Haskelite Mfg. Corp.

Weatherproofing
Morton Mfg. Co.

Welded Rail Joints
Electric Railway Improvement Co.
Metal & Thermit Corp.
Ohio Brass Co
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Electric Railway Improvement Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Electric Railway Improvement Co.
General Electric Co.
Metal & Thermit Corp.
Nat'l Ry. Appliance Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M Co

Welding and Cutting Tools
International Oxygen Co.

Welding Steel
Electric Railway Improvement Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
General Electric Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Bemis Car Truck Co.
Griffin Wheel Co.

Wheels, Car, Steel & Steel Tire
American Steel Foundries
Carnegie Steel Co.

Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

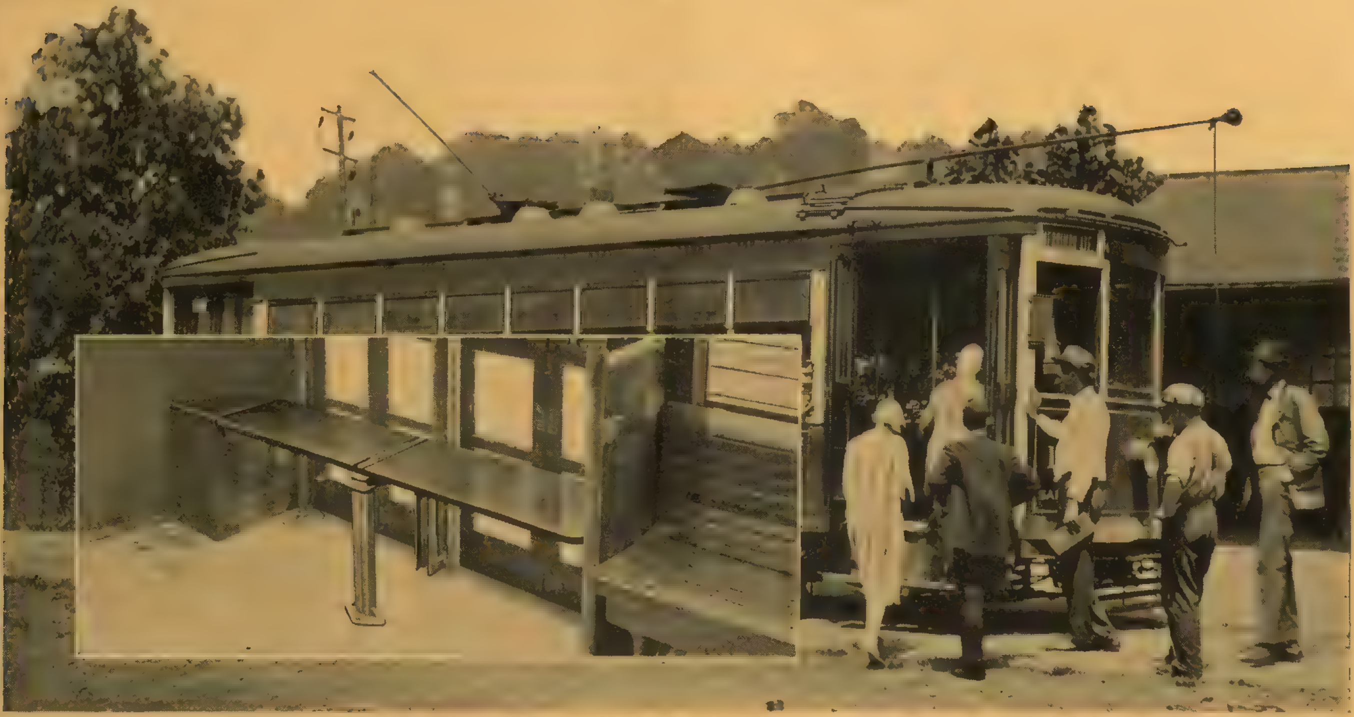
Wheels, Wrought Steel
Carnegie Steel Co.

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co
Westinghouse Traction Brake Co.

Window Sash, Locks and Racks
Morton Mfg. Co.

Wire Rope
American Steel & Wire Co
Roebling's Sons Co., J A

Wires and Cables
American Brass Co.
American Electrical Works
American Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Graybar Electric Co.
Kerite Insulated Wire & Cable Co.
Okonite Co.
Okonite-Callender Cable Co., Inc.
Roebling's Sons Co., J. A
Westinghouse E. & M Co.



Seating capacity of Asheville's safety cars increased to 40 with Brill "Admor" Seats

Brill "Admor" Seats

Increase Seating Capacity

More Seated Passengers
More Satisfied Riders
More Revenue Passengers

A few railways which have adopted Brill "Admor" Seats:

Brooklyn City R.R. Co.
Miami Beach Railway Co.
Asheville Power & Light Co.
Washington Ry & Elec. Co.
Chilian Elec. Co., Santiago
Mobile Light & R.R. Co.
Edison-Potomac Co.
Dallas Railway Co.

On double-end cars having wide door openings at all four corners, the installation of Brill "Admor" Seats across all of them makes possible its use on the left-hand side at all times. Consequently, if the door openings are wide enough to accommodate a five-passenger seat, the seating capacity of a 48-passenger car may be increased to 58, or over twenty per cent. If arranged for one-man, two-man operation, in which case the seats on both sides of the rear platform may be used at times, the seating capacity of this car may be increased to 63 passengers.

When not in service the Brill "Admor" Seat functions as a substantial barrier, dividing the door openings between in and out-going passengers when, under one-man operation, both classes of passengers use the same platform. It also serves as a "grab" for these passengers.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — ST. LOUIS MO. — G.C. KUHLMAN CAR CO. — CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

One motor or two

Some companies, contemplating the operation of gas-electric buses, wish to avail themselves of the obvious advantages offered by two-motor drive. Others prefer the greater simplicity and the lighter weight of a single-motor equipment and believe that the advantages of dual-drive are offset by the increased first cost.

General Electric builds electrical equipment for both types of drive, adaptable to any standard chassis. In co-operation with leading bus builders, it can furnish gas-electric drive to meet these alternative requirements, as may be determined by personal preference or operating conditions.

Just specify: *the electrical equipment shall be G-E.*

The trade mark of General Electric on bus equipment is a guarantee of successful service. It stands for a high degree of excellence in this electrical equipment such as has been recognized for years in G-E equipment for other phases of transportation.

Dual Drive—its advantages:

The differential is eliminated, which reduces the chance of wheel slippage and skidding—

Better clearance is afforded below the motors for a given floor height—

Operation with one motor is possible in emergencies.

Single-Motor Drive—its advantages:

This equipment is lighter in weight and has a lower first cost—

It permits the use of standard rear axles—

Any chassis can be more readily adapted to electric drive of this type.

GENERAL ELECTRIC

ENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK SALES OFFICES IN ALL PRINCIPAL CITIES

McGraw-Hill Publishing Company, Inc. September 18, 1926 Twenty Cents per Copy

ELECTRIC RAILWAY JOURNAL

UNITED STATES ROYAL CORD Motorcoach

Where the Extra Measure of Mileage is Most Important

THE experienced motorcoach operator knows the importance of maintained schedules. Tire failure not only means additional operating expense but loss of revenue.

The United States Royal Cord Motorcoach Tire has been *specifically* designed to meet the tire punishing conditions of motorcoach service.

Every resource of the world's largest growers and manufacturers of rubber has been brought to the building of a tire that gives "lowest possible cost per tire mile" over varying conditions of driving, road, load and weather.

United States Rubber Company

Trade US Mark

UNITED STATES
ROYAL CORD
Motorcoach

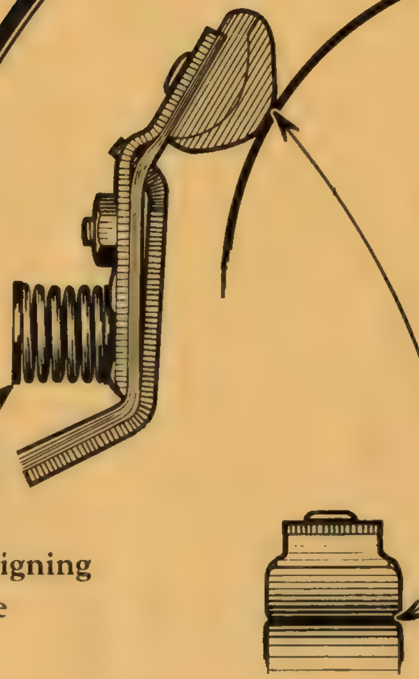
NITED STATES TIRES ARE GOOD TIRES

Maximum Contact Always!

WESTINGHOUSE ELECTRIC

Compensating Fingers

are self-aligning. Regardless of the contour of the controller drum surface, Westinghouse compensating fingers automatically adjust themselves to the position of maximum contact; they automatically provide an adequate contact area, within the capacity of the controller, to prevent heating or burning.



Self-Aligning Feature

Study the illustration at the left; under the constant pressure of a long-lived *coil* spring the finger finds its own position. There can be no one-spot contact to heat or burn, even on badly worn controllers.

Ask the Westinghouse salesman for futher information and prices.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in all Principal Cities of
the United States and Foreign Countries

MEMBER AERA 1926

Westinghouse

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Experience Speaks

WHAT is ahead for the industry? That is the subject which occupies first place in the minds of transportation executives and bankers. Can local transportation be made to pay a reasonable profit? Can new money be attracted for rehabilitation and development with reasonable assurance that it will earn a fair return?

Experience is convincing. Actual results accomplished by one property under given conditions are the best indications of what may be expected by others that apply the same methods. When the record of experience that is presented covers many properties of varying size and wide geographical distribution, it changes conjecture and opinion to firm conviction.

Methods by which they have succeeded in "Making Transportation Pay" will be described by executives of many electric railways in next week's Annual Convention Number of the JOURNAL. These men have given liberally of their valuable time to tell the industry what they have done and how they have done it. They speak from experience.

With the vision to discern clearly the needs of the hour, and the courage to take the necessary steps to modernize their properties, these executives have been pathfinders of the industry. They have found the way to put transportation on a paying basis. Don't miss the Annual Convention Issue next week.

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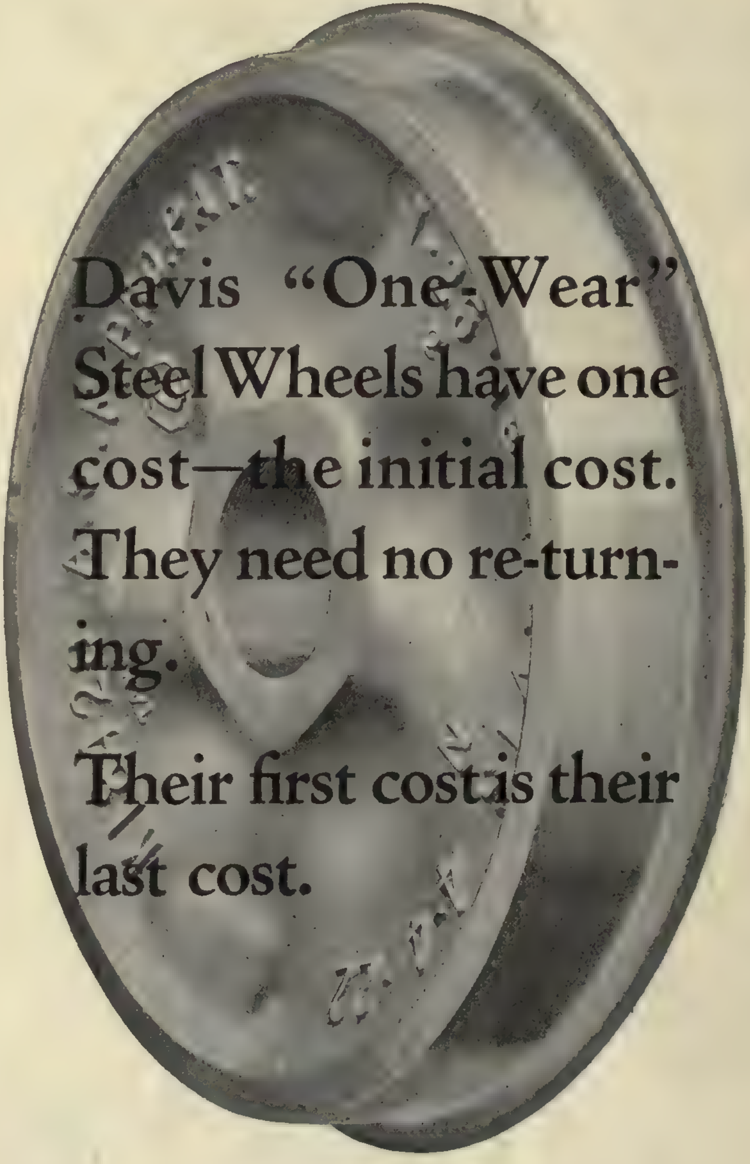


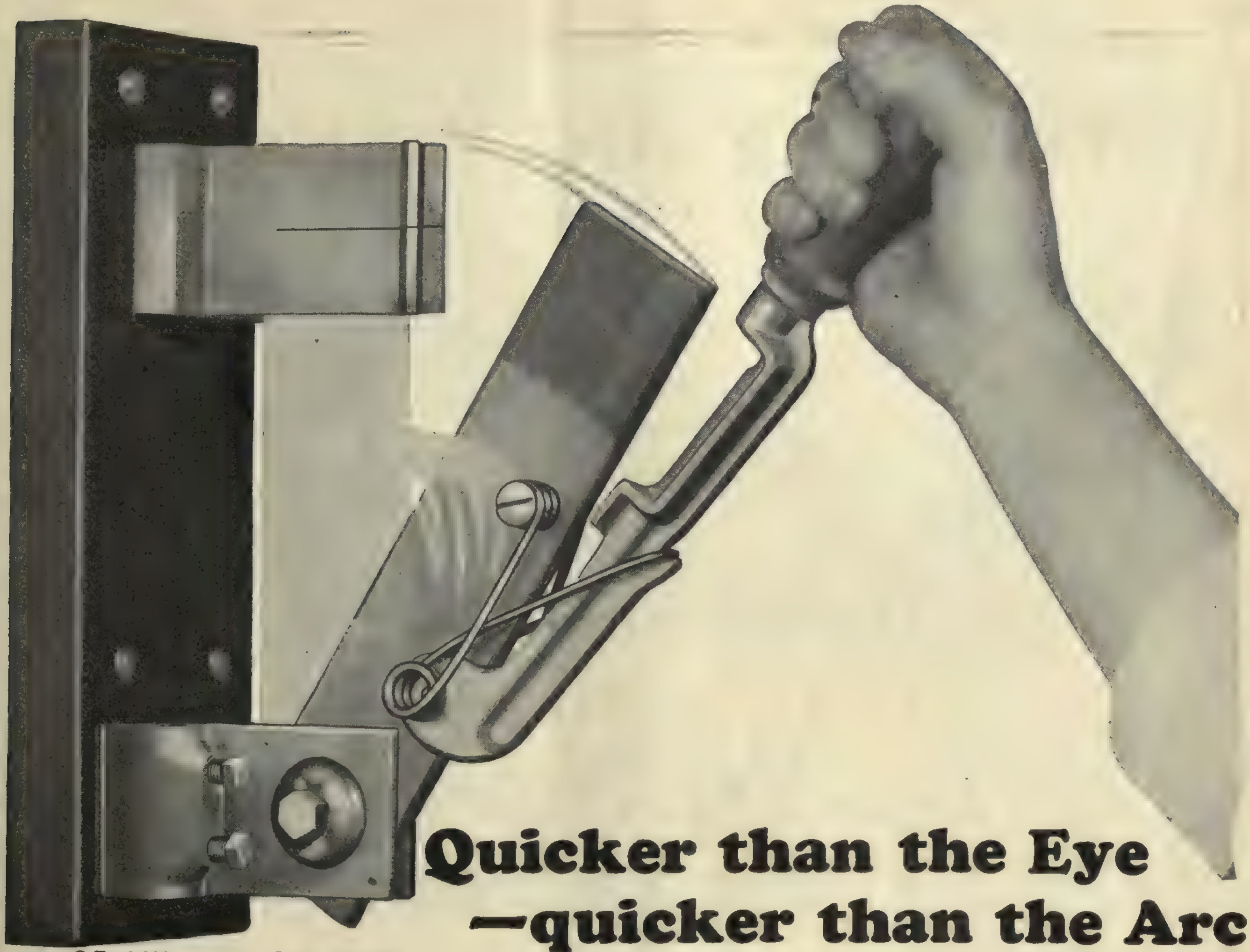
YOU PAY ONLY ONCE

Davis "One-Wear" Steel Wheels have one cost—the initial cost. They need no re-turning.

Their first cost is their last cost.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



O-B 1,000 ampere Line Section Switch, single pole, without separable terminals. Cat. No. 11365

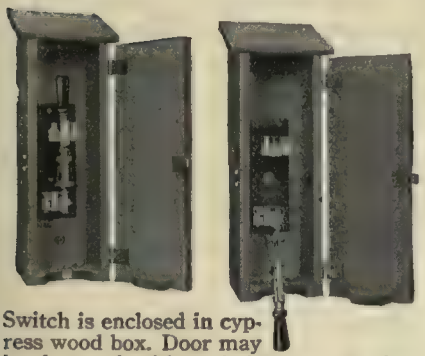
Quicker than the Eye —quicker than the Arc

THE entire break is made with the big, current-carrying blade itself—there is no secondary blade nor auxiliary device to work loose. No springs nor small parts are called upon to carry the current, even momentarily.

Pulling the handle brings into play a powerful phosphor bronze spring, which snaps the blade out of the contacts. A wide gap is formed so quickly that the arc cannot carry over.

Latest improvements include heavier slate bases, more contact surfaces, ground-in contacts all around, and a big soft rubber grip on the handle. The handle itself is of Flecto Iron, the O-B brittle-free hot-dipped galvanized malleable.

Furnished with, or without switch boxes, in capacities from 100 to 1000 amperes—750 volt rating. Shipped from stock.

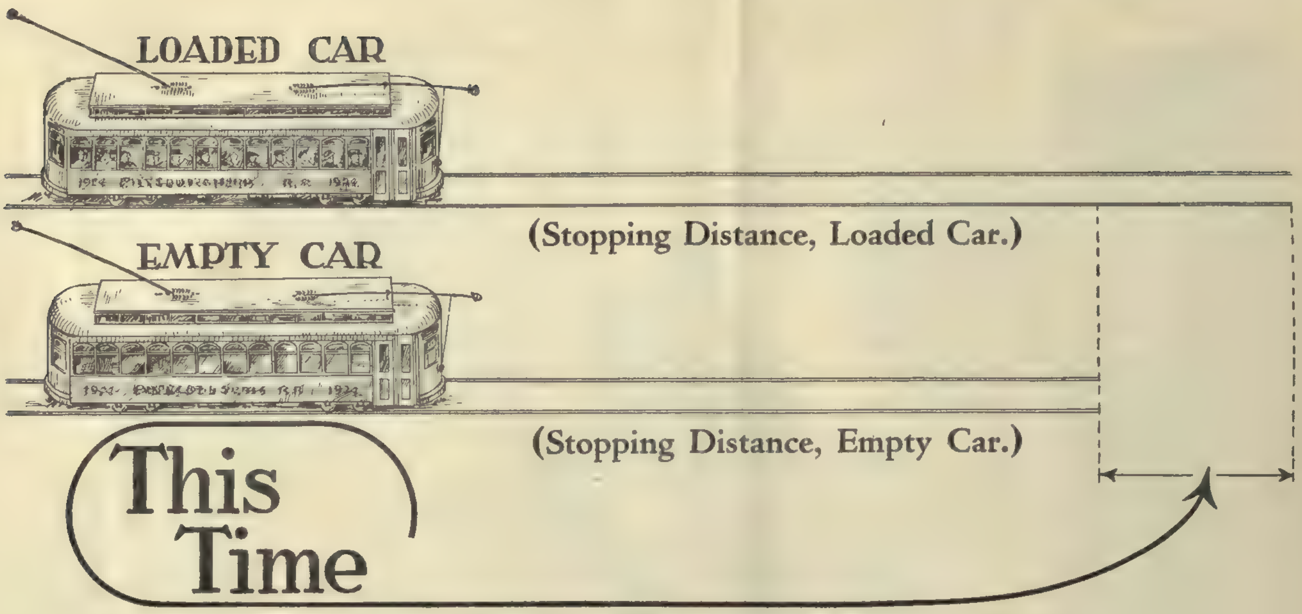


Switch is enclosed in cypress wood box. Door may be fastened with switch open or shut. When switch is open insulated handle only, projects through slot in bottom of box. When switch is shut this slot is covered by a spring-closed slide. All hardware fittings are of bronze.

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
1608

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES


LOADED CAR
(Stopping Distance, Loaded Car.)
EMPTY CAR
(Stopping Distance, Empty Car.)

This Time Can be Saved

WITH the ordinary form of air brake equipment the maximum retarding force is limited to that which is ample and permissible for an empty car, but which is inadequate to effect the proper degree of control on a loaded car—particularly if it has a high ratio of loaded to light weight—with the result that the stop is lengthened and more time is consumed.

But this time can be saved!

The Westinghouse Variable Load Brake, adapted specifically for modern light weight surface cars, eliminates the difference in retarding effect on empty and loaded cars—by an automatic adjustment of brake cylinder pressure with the changing load—and insures that stops will be as short under all conditions as would normally be possible only with an empty car.

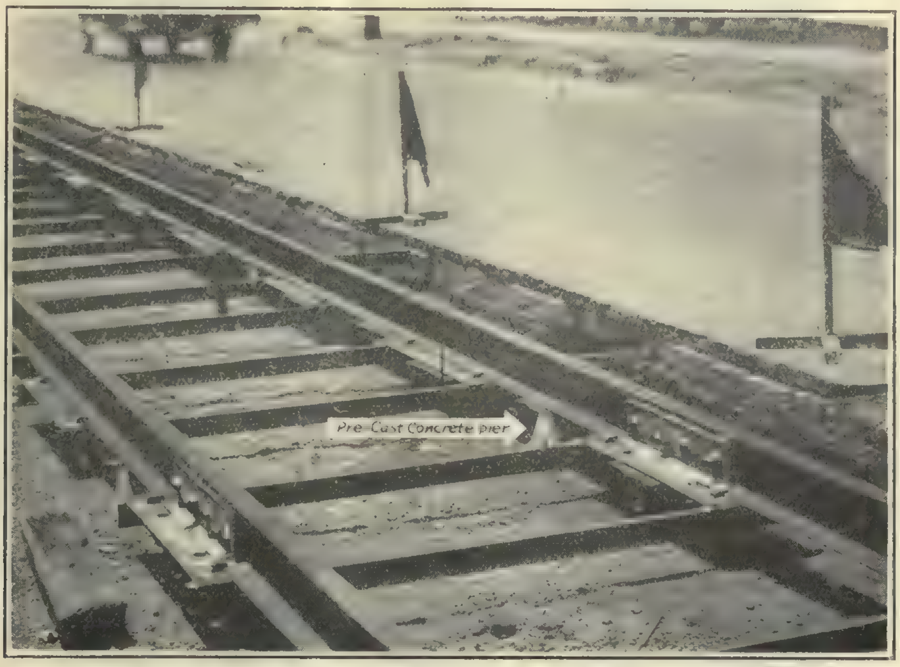
The saving in time, effected by the uniformly shorter stops, is translated into faster schedule speeds just when time is most valuable—during those periods when there is a demand for quick transportation of large volumes of revenue-producing traffic.

Mass transportation can be accelerated to increase the profit and popularity of your service by the use of this modern brake on your modern cars.

Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office — *Ask for Descriptive Catalogue T-2045.*

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES



"Perishable materials are sometimes utilized in the construction of track, in the effort to secure flexibility, and *the life of the track is shortened* to that of the perishable material"*

THIS simple idea is one of the fundamentals of Twin Tie construction. The combination of steel and concrete provides a uniform structure in which no part limits, by its shorter life, the life of the whole.

When steel, well proportioned, provides large bearing surfaces, tie members, and reinforcement for the concrete foundation of such construction, the life of the rail becomes the limiting factor in the life of your track.

Initial costs of twin tie construction are very low. Detailed figures from many jobs are available for comparison with your estimate and costs.—Write for them today.

*Quotation from a paper, "Modern City Track," read by Nelson R. Love, Chief Engineer of The Denver Tramway Corporation, at the Mid-West Electric Railway Association Meeting at Denver, July, 1926. We will be pleased to mail a copy of the complete article to those interested.

The International Steel Tie Co.
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation

WEST RIDGE TRANSPORTATION COMPANY

Erie Pa., to Conneaut, O.

WEST BOUND

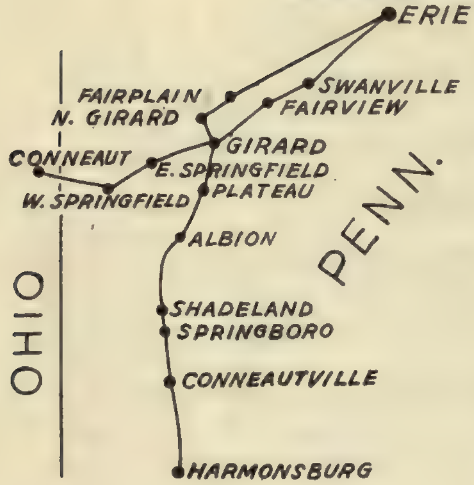
Eastern Standard Time

Int. Sta., ERIE
Asbury
Swanville
Fairview
County Farm
GIRARD (Ar)
GIRARD (Lv)
E. Springfield
W. Springfield
CONNEAUT

Conneaut, O., to Erie, Pa.

EAST BOUND

CONNEAUT
W. Springfield
E. Springfield
GIRARD (Ar)
GIRARD (Lv)
County Farm
Fairview
Swanville
Asbury
Int. Sta., ERIE



CLOSE TO CLEVELAND

There are nine fleet Greyhound Parlor Cars operated by West Ridge Transportation Company of Girard, Pennsylvania, daily making economy records that help to enhance the net profit for the operators.

The first of these Greyhounds, placed in service during May, 1925, operated its first seven months period, brought the following comment from the owners—"We have 57,080 miles on the first Greyhound purchased from you and have changed one tire—the left rear." This is only one instance of the many operating economies that are obtainable from Garford Greyhound Buses when put to test in actual service. Greyhound owners in increasing numbers testify that Garford Economy is helping them make a greater net profit from their bus operations. Write for details.

IN CLEVELAND

The Greyhounds will again be on display at the A.E.R.A. Exhibit, October 4th to 8th inclusive. Duplicates of the Greyhound Bus here illustrated will be shown in Spaces 302A and 303A.

GARFORD PIONEERED 4-WHEEL BRAKES ON MOTOR BUSES

GARFORD TRUCK COMPANY

651-681 Wapak Road
Lima, Ohio

Use ESSCO CATALOG No. 7

Here you will find listed, illustrated and described, thousands of devices, parts and supplies. The tiniest screw in a Faraday Buzzer can be identified and ordered by its Catalog number. The lens or reflector for a Golden Glow Headlight is likewise cataloged. Whether it's a gear case or a match box holder you're looking for—ESSCO Catalog No. 7 should be your first reference.

ELECTRIC SERVICE SUPPLIES Co,

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17th and Cambria Sts.

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50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

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1123 Bessemer Bldg.

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

KEYSTONE CAR EQUIPMENT

Some Items Selected from ESSCO Catalog No. 7

Golden Glow Headlights
Faraday Signal Systems
Hunter-Keystone Signs
Steel Gear Cases
Motormen's Seats
Lighting Fixtures
Headlight Resistances
Air Sanders
Trolley Catchers
Shelby Trolley Poles

Rotary Gongs
International Fare Registers
Fare Register Fittings
Samson Cordage
Air Valves
Cord Connectors
Trailer Connectors
Automatic Door Signals
Standard Trolley Harps
Standard Trolley Wheels

Peerless Coil Winding Tools
Peerless Armature Machines
Insulating Materials
Cass Commutator Stones
Sand Driers
Peerless Pinion Pullers
Employees' Badges
Line Material
Portable Lamp Guards

The Largest Trackage Extension in 1925

Included "Phono-Electric" *Trolley Wire*

Part of the new installation on the Skokie Valley Route of the Chicago, North Shore & Milwaukee R.R.

That first place was won by Chicago, North Shore & Milwaukee for trackage extension in 1925—totaling a mileage many times greater than that made by any other electric road—is a tribute to its progressive policy and to the high standard of service for which its lines have become famous.

This extension, known as the Skokie Valley Route, will give the "North Shore Line" another private right of way between Dempster Street and Waukegan, and will effect a material saving in the running time of the fast limited trains out of, and into, Chicago.

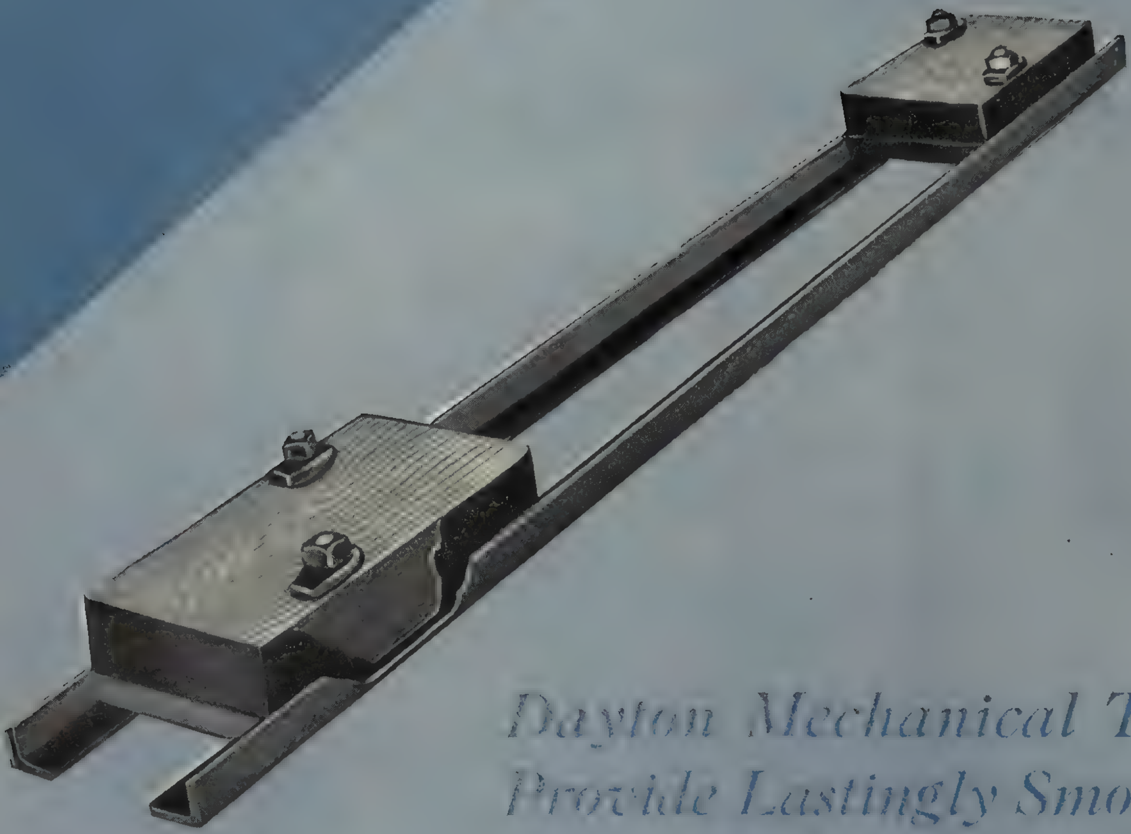
The fact that 45 miles of Phono-Electric Trolley Wire was ordered for this, the only big extension of the year, points a trend in modern overhead practice that cannot be ignored. High speeds, and better service, coupled with a growing need for careful watching of costs, have made the exceptional wearing qualities of Phono, its strength and consequent freedom from breaks, and its high resistance both to mechanical and hot-cold fatigue, of vital importance to every progressive operator.

MEMBER AERA

Bridgeport Brass Company
BRIDGEPORT - CONNECTICUT

Comfort Wins Patronage

Lastingly Smooth Track Provided By Dayton Mechanical Ties Is Necessary To Comfort



Dayton Mechanical Ties Provide Lastingly Smooth Track With Virtually No Maintenance

Comfort provided by attractive cars, and permanently smooth track increases the number of revenue passengers. Electric street railways are realizing this more and more.

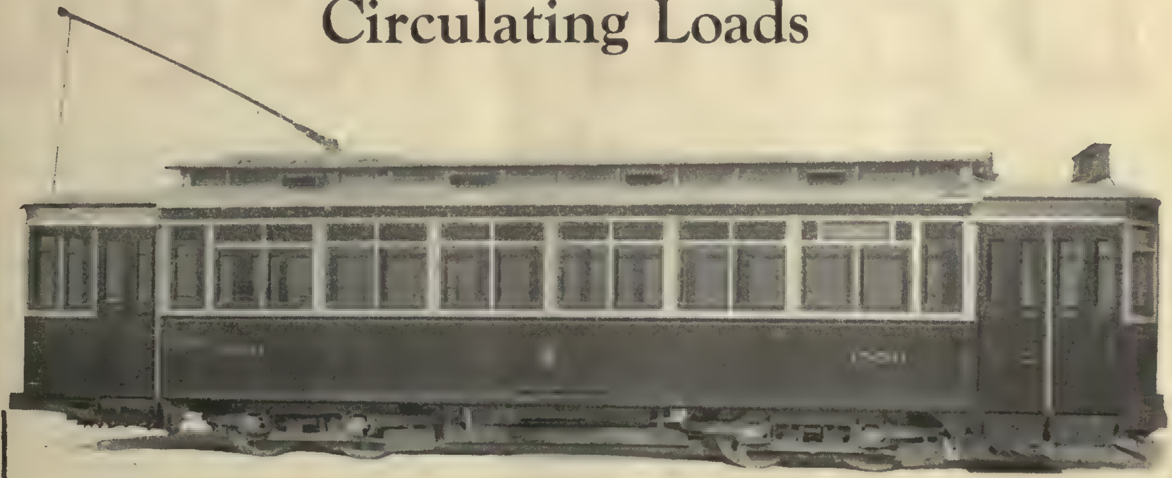
Dayton Mechanical Ties are contributing to this profitable riding comfort all over the nation by providing permanently smooth track.

Inbuilt resilience of Dayton Ties absorbs the shocks that would otherwise destroy ballast and break down the track. Track laid on them remains in perfect condition 10-12 years—even longer—with no maintenance beyond inspection. Smoothness and resiliency also keep down rolling stock repairs.

There is a real story of profit and saving in Dayton Ties. Write for complete information.

The Dayton Mechanical Tie Co.,
Dayton, Ohio.

The Tendency Towards One-Man Operation Created the Necessity for Circulating Loads



THE tendency towards one-man operation is not confined to single-truck cars but now extends to the largest type of double-truck cars which formerly were operated by two men. Conversion of this type of car created the necessity for circulating loads. The circulating load, in turn, has been made possible by installation of the Automatic Treadle Door which relieves the operator from all controlling duties in connection with his exit doors and steps.

NP

NATIONAL PNEUMATIC COMPANY
Executive Office, 50 Church Street New York
General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

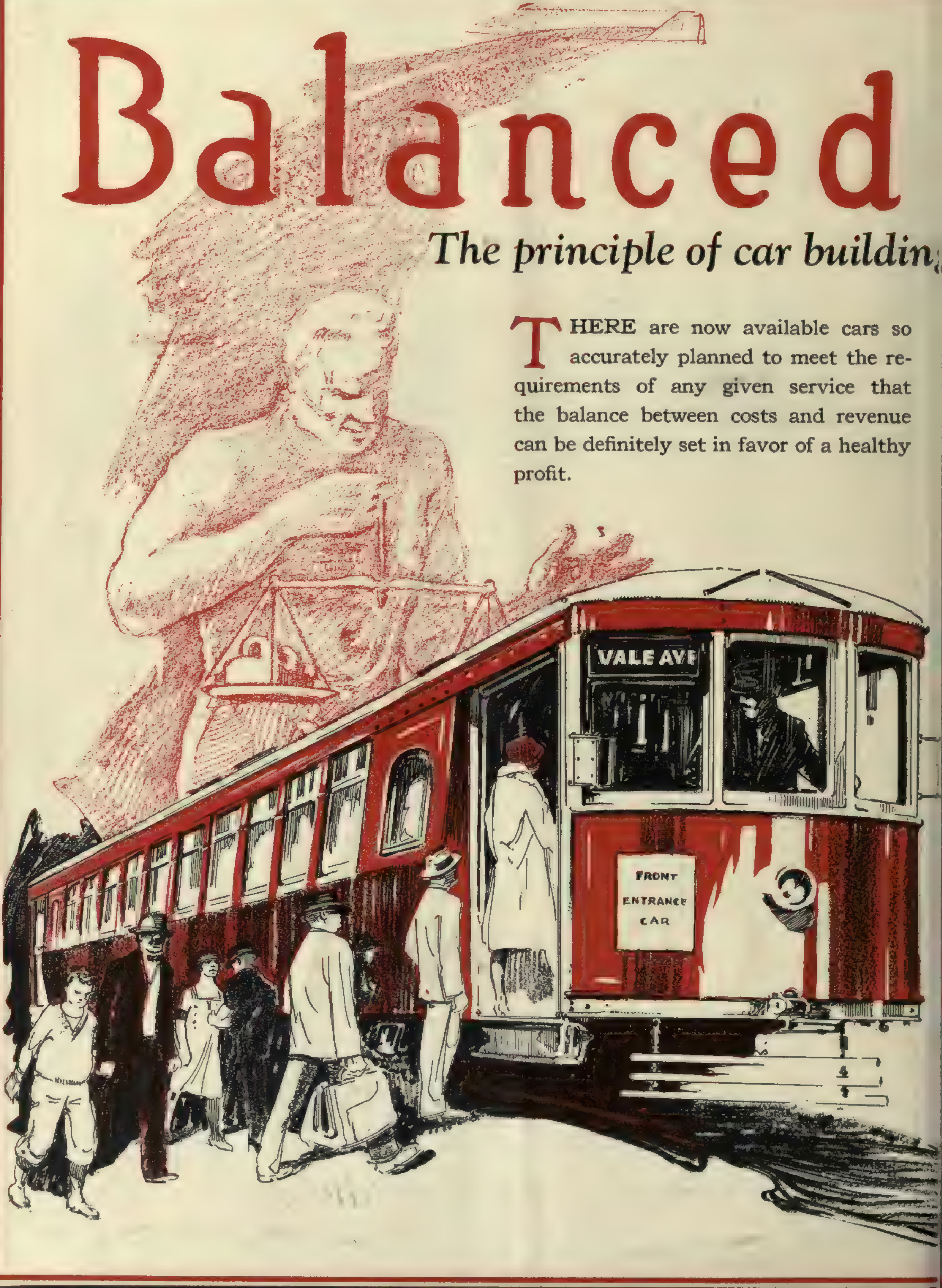
MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

Balanced

The principle of car buildin

THERE are now available cars so accurately planned to meet the requirements of any given service that the balance between costs and revenue can be definitely set in favor of a healthy profit.



design

hat makes transportation pay—and pay well

These cars—Cincinnati NEW Lightweight Cars,—raise the standard of car appearance, passenger comfort and mechanical efficiency to a point hitherto discussed only as an ideal. For city service they are mounted on a truck of exceptionally easy riding qualities,—designed to stand severe wear and tear. For Interurban service there is a unique high-speed truck which makes 60 miles an hour possible, with comfort and safety, on cars of distinctly lightweight construction.

Such features of the Cincinnati design as "Quartered Equalization" (employed in the new high speed truck mentioned above); Curved Side Construction, permitting wide aisles with maximum roof and wagon clearance; and the exclusive Cincinnati Body Construction have resulted in a series of cars equally unique in appearance and performance.

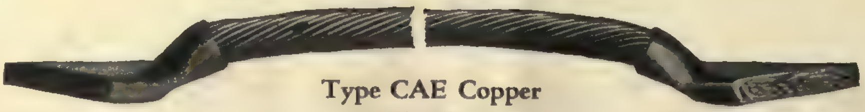
Logically it follows that the actual results obtained on Cincinnati Balanced Lightweight New Car installations made to date have invariably been satisfactory to both operator and riding public.

We have plenty of FACTS to back up every statement made in these advertisements. Cincinnati new cars pay—*and pay well!* The figures are immediately available to any interested electric railway executive.

THE CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI
New
CARS

*A step ahead
of the modern trend*



Type CAE Copper Weld Bond

Type CAE Bond Applied

Bonded stock - - -

even inexperienced welders get good results

Type CAE bonds represent the highest development of the direct copper weld type of rail bond and possess the following exclusive points of superiority.

1. Large area of copper strands.
2. Positive uniting in the weld of every strand of copper conductor.
3. Large area of weld easily obtained.
4. No molds or cups are required.
5. The heavy copper sheath eliminates all strains where the copper strands unite with the weld.
6. The specially coated Erico Copper Welding Rod makes a solid, tough weld.
7. Low installation costs.

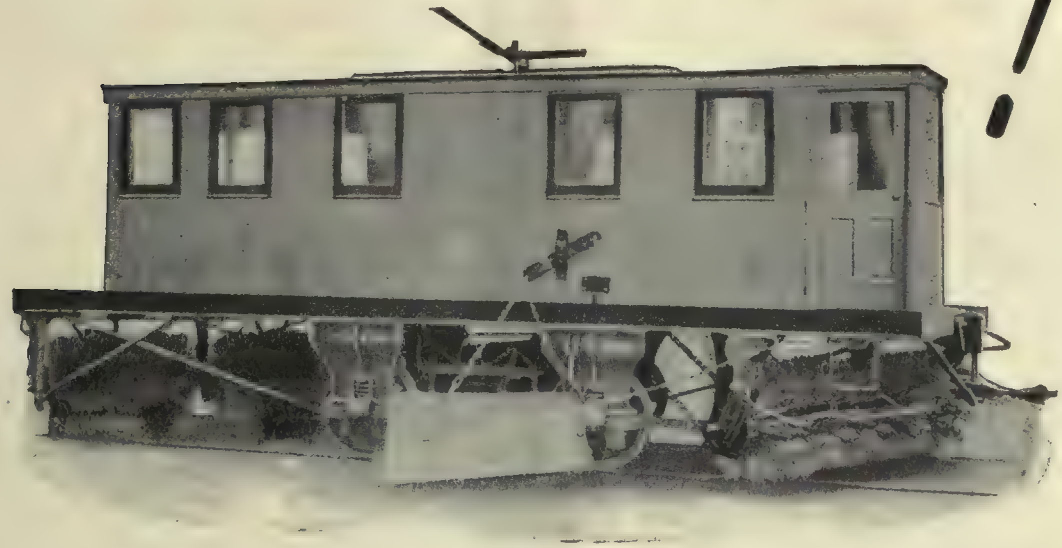
Send for Circular No. 15.

ERICO

ERICO

The Electric Railway Improvement Company
2070 East 61st Place, Cleveland, Ohio

Maintain your Schedules!



Remove Snow with this efficient Cummings sweeper

The standard single truck, steel underframe, long broom sweeper illustrated is exceptionally strong and rigidly built, handling deep snow rapidly without stalling. The long broom clears both rails and fifteen inches additional on either side. The case hardened roller bar attachable steel chains have tensile strength of 28,000 lbs. This is the standard sweeper on the majority of electric railways.

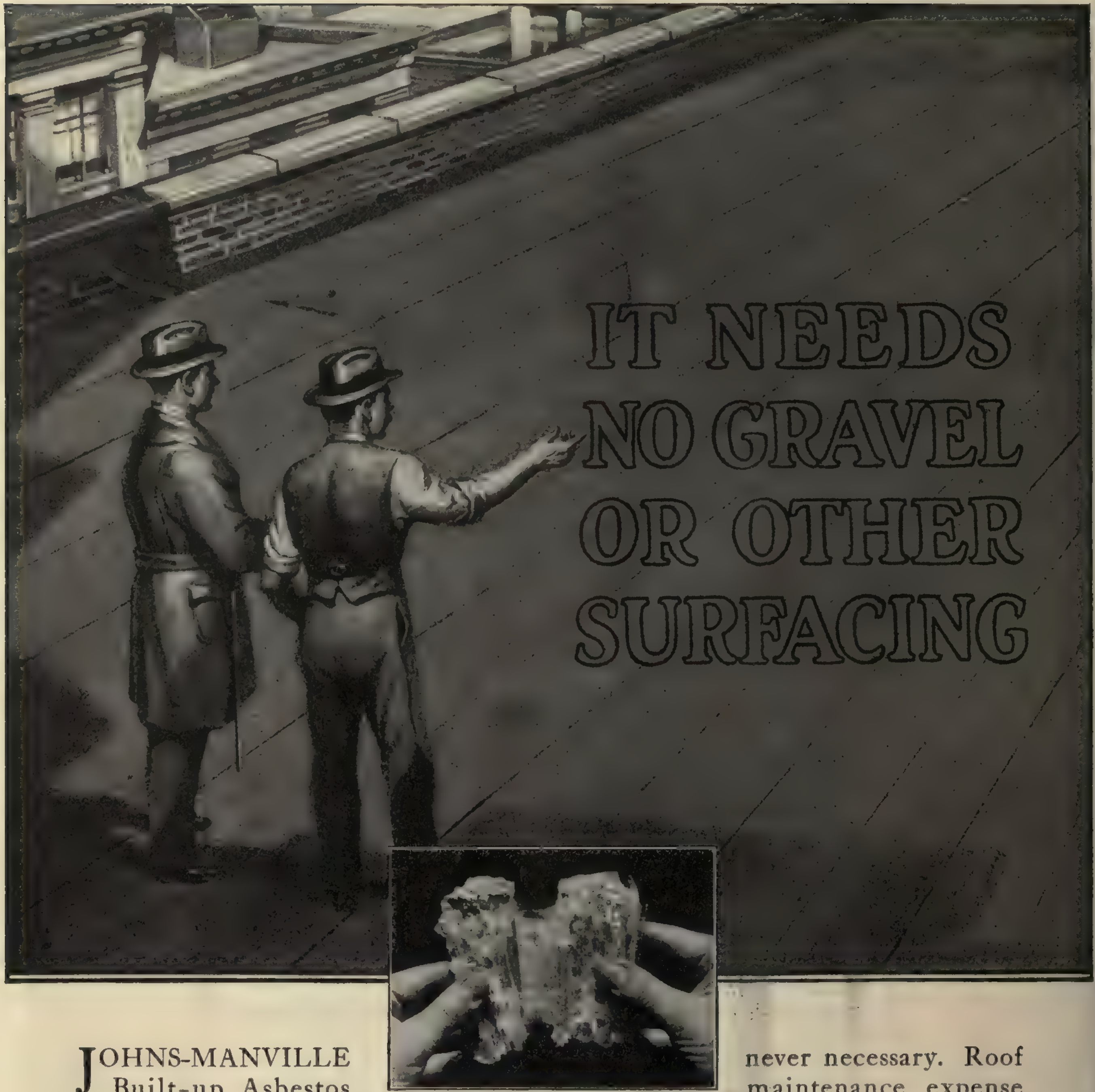
Double truck sweepers and plows are built to meet any snow-fighting condition.

Cummings Car and Coach Co.

Successors to McGUIRE CUMMINGS MFG. CO.

111 W. Monroe Street
Chicago, Ill.

Builders of Modern
Lightweight Street Cars
Single and Double Trucks
Snow plows, Snow sweepers
Gas-Electric Motor Coaches



Crude Asbestos as it comes from the mine.

JOHNS-MANVILLE Built-up Asbestos Roofings are all-mineral so they never need the protection of surfacing. Made of asbestos and mineral asphalts they give positive and everlasting protection against all weather without the excessive weight and cost that gravel adds.

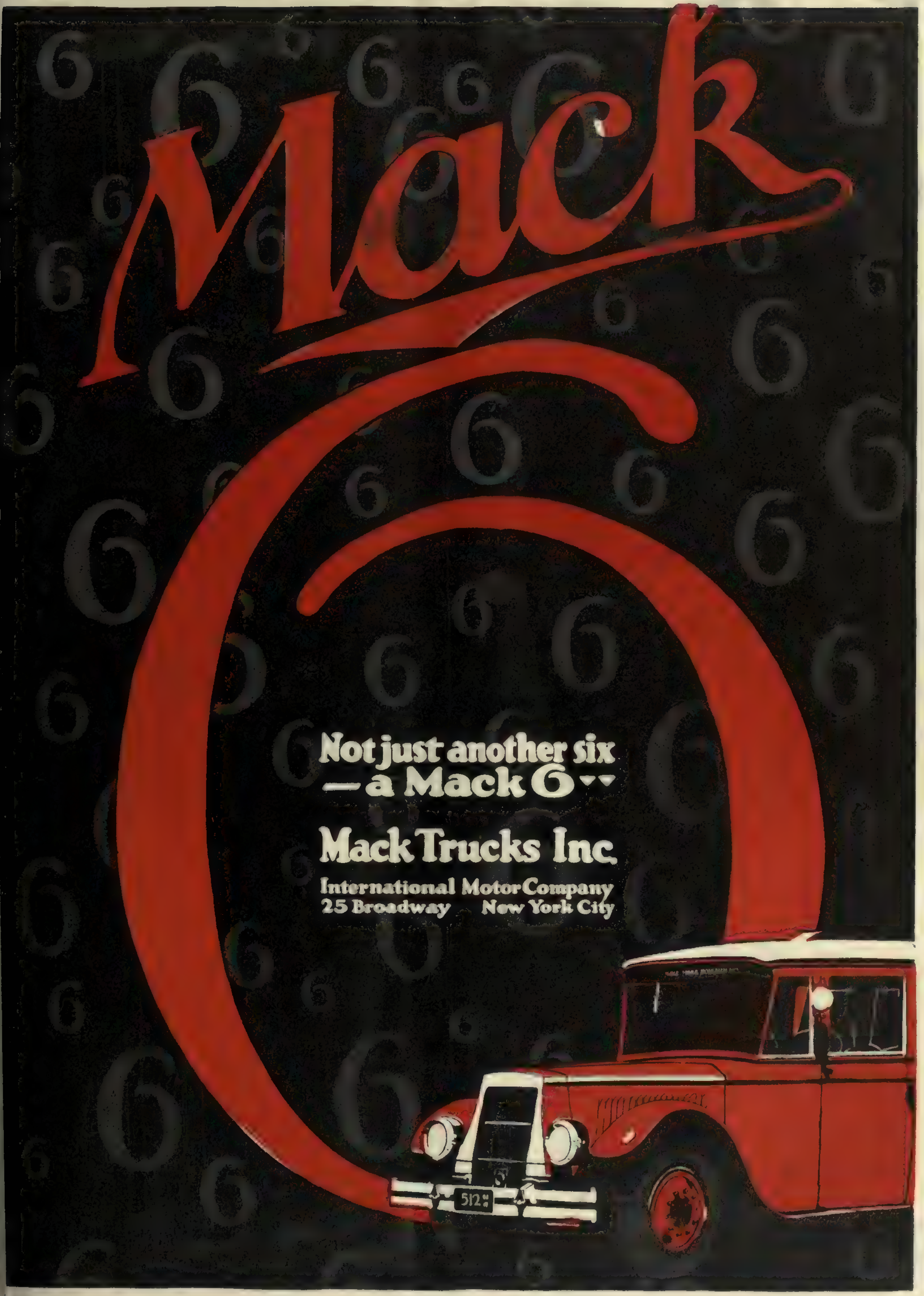
Painting or coating of any sort are never necessary. Roof maintenance expense common to most buildings practically never occurs with a Johns-Manville Built-up Asbestos Roof. And asbestos gives that permanence which eliminates extensive repairs or future replacement.

JOHNS-MANVILLE INC.
292 Madison Avenue at 41st Street, New York City
Branches in all large cities: For Canada: Canadian Johns-Manville Co., Ltd., Toronto

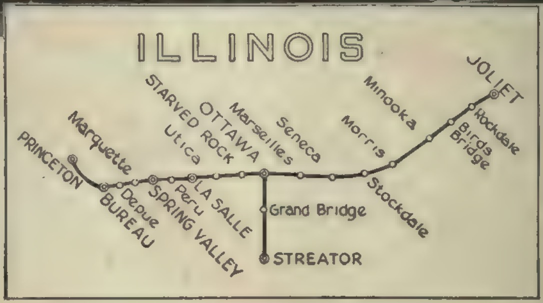
JOHNS-MANVILLE

Asbestos and its allied products
INSULATION
BRAKE LININGS
ROOFINGS
PACKINGS
CEMENTS
FIRE PREVENTION PRODUCTS

Asbestos Roofings


Mack
6
Not just another six
— a Mack 6 ••
Mack Trucks Inc.
International Motor Company
25 Broadway New York City
512

Through specific figures, facts are revealed. Experience of a few years with modern light-weight cars, both city and interurban, has furnished convincing proof that new revenues can be developed and substantial savings effected.



A significant page from recent Illinois Traction history

In 1924 this company replaced its 94,000-lb. interurban cars, operated on the Illinois Valley Division, with new 37,000-lb. one-man cars and decreased its headway from 2 hours to 1 hour. The financial gain realized in 1925 from operating these modern cars, which are all equipped with G-E Motors and Control, is indicated by the following facts:

> Although two more city cars were operated on the system than in 1923, there was a reduction of 33% in the shop force.
>
> Even with an increase of 70% in interurban passenger car mileage, operating expenses were less by $39,000.
>
> On account of the more attractive cars and reduction in headway, passenger revenue increased $33,000—the total savings, therefore, being about $72,000 or a gross return of about 39% on the investment.
>
> Of 22,239 trains operated in 1923, 92% were on time; in 1925 the number of trains increased to 32,858, of which 97% were on time.

The comparative operating costs per car-mile for accounts affected by the new cars are:

	1923	1925	Saving per C. M.	% reduction
Equipment	3.60	0.95	2.65	73
*Power Purchased	5.80	3.35	2.45	42
Platform expense	5.17	3.75	1.42	27

**All service*

This achievement in improving service and lowering costs of operation is another instance of the success of modern G-E Car Equipment. For these new Illinois Traction cars, G-E-265 Motors with K-35 Control were selected.

330-23

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

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Chicago Gets a Transportation Proposal

THE mysterious proposal on the part of a group of New York bankers for financing Chicago's local transportation facilities on the basis of a twenty-year franchise has finally come into the light. Advertisements carried in Chicago newspapers publish in full the terms of the proposal for "Solving Chicago's transportation problem, immediately and permanently without new state legislation." The terms of the plan offered carry some unique and interesting features.

There is little beating around the bush in the proposal. The intent seems quite evident and the "teeth" of the plan are in the first paragraph:

> The new ordinance to grant a permit, good for twenty years, not only to acquire and operate street railways and to establish motor bus lines in all streets now being used for street railway purposes, but also to establish and operate motor bus lines in all other streets, in which it may be deemed advisable that motor bus lines be operated in connection with the new company's lines in streets now being used for street railway purposes; such permit to become operative Feb. 1, 1927, or as soon thereafter as such new ordinance shall be duly accepted by the new company, the time allowed for such acceptance to be fixed in the new ordinance.

It is needless to go at length here into the forms of security which it is proposed to issue. The high spots of the financial plan proposed are outlined in a news story elsewhere in this issue. The rate of fare is to be enough to pay the cost of maintaining and operating all the new company's lines efficiently and adequately; to meet the requirements of the sinking funds, renewals and depreciation fund and other funds, and deductions from gross earnings to pay the annual interest of all outstanding bonds of the new company.

To quote again:

> If on Feb. 1, 1927, the existing companies shall not have vacated the streets now occupied by their tracks and yielded possession thereof to the new company, upon the terms laid down in the new ordinance or mutually agreed upon between them and the new company, then the city shall promptly give to the existing companies notice to remove within six months all their tracks and other property from the city streets and restore the parts thereof so occupied by their tracks and other property to the same condition as the contiguous portions of such streets.

And again:

> Whenever the new company shall have acquired lawful possession of or the right to use and operate the street railway properties of the existing companies, then promptly following such acquisition the new company shall begin to operate and thereafter, so long as the new ordinance shall be in force, shall continue to operate said street railway properties and *may, if it shall so elect, discontinue the operation of motor buses in those streets in which street railways are being operated by the new company.*

Here, in brief, is the plan in some of its essential features offered Chicago. The right to operate buses on any and all streets—with the people paying the cost of this duplication of service—forms an excellent club to force existing security holders to accept terms such as the new company might elect to dictate.

It is probably a practical method of financing on a twenty-year franchise—from the bankers' viewpoint. But is it a sound basis for developing a transportation system? Is it fair to those who invested in existing street railway securities in good faith? Chicago may well afford to consider in this light some of the conditions contained in this unique proposal.

Purchasing for Actual Needs

"HAND-TO-MOUTH buying," so called, has been characterized by Eugene G. Grace, president of the Bethlehem Steel Company, as one of the greatest contributing factors toward stabilized national prosperity which has made itself felt to date. In an article which appeared in the *Saturday Evening Post* for Sept. 4 entitled "Distributed Prosperity" Mr. Grace indicates the manner in which the practice of hand-to-mouth buying has come upon us. He traces the beneficial effects which it has already exerted upon industry since it first became noticeable in 1923 as a characteristic in the national economic structure. Decried at the outset, and in many quarters even today, as a radical departure in fundamental industrial policies and as a sure indication of coming economic depression, the practice has continued to develop and gain in favor. Today, according to Mr. Grace's analysis of the situation, we may thank this one practice more than anything else for the decrease in seasonal activity in such industries as that of steel, which had always been subject to wide fluctuations throughout each year.

The whole industrial fabric of the nation is so closely knit that factors which affect one part must inevitably be felt by all. Hence the railways, electric as well as steam, should have much to gain from this same manner of buying. Too fully stocked storerooms and top-heavy inventories have come to be looked on as economic wastes. They require a large amount of tied-up capital which might better be in active use. Further, more uniform buying throughout the year tends to stabilize the industries which supply the railways with their raw materials and improves conditions of employment. At the other extreme, electric railways have in some instances been guilty of buying replacement parts in ridiculously small quantities.

Somewhat unfortunate is the term "hand-to-mouth buying." It implies lack of thrift and foresight. "Producing for consumption" was suggested by Mr. Grace as a more satisfactory term. To this might be added "buying for actual needs." These phrases cover the two sides of the question, producing and consuming.

It would, of course, be foolhardy to permit inventories to fall below a safe minimum. When a part is needed in repairing a car it is needed badly and must be immediately available. But all Mr. Grace would urge in this or in any other case is the striking of a common-sense medium. Much buying has been done in the past on the "fundamental principles of the old-fashioned crossroads store," whereas a little of the psychology of the chain store would now be very much in order.

Consider for a moment why it was that the crossroads store purchased, as it did, in yearly lots. Execrable transportation and slow means of communication made it necessary for the country merchant to safeguard against running short of merchandise by stocking in unduly large quantities. Today, however, he can dispatch a wire for a bill of goods and in a day or two will receive his order from a conveniently located distributing point. The wholesaler, on the other hand, watched the markets and endeavored to purchase when materials were cheapest. These factors were largely responsible for the wide fluctuations in prices which formerly marked the industrial scheme of things. There is no logic in continuing to base present-day marketing procedure on conditions no longer existent.

A Living Wage Depends on the Liver

RECENT labor discussions in Chicago, Cincinnati, Birmingham, New Orleans, Boston and Newark raise anew the question of the living wage. It is an intriguing issue, this. In some of these cities the matter of wages was settled by conciliation rather than arbitration, but the assumption seems reasonable that much the same conditions govern the economic status of the employees in the other cities mentioned as surround the Eastern Massachusetts men at Boston. If that case may be taken as typical, then things are not so bad with the employees. Mr. Wadleigh for the company made this quite plain. In fact, he appears to have made it plain beyond peradventure, but the members of the board may decide differently. Even in that event it would still remain true that the plight of the Massachusetts men is not a distressing one. Their average wage is $1,825 a year. Their average age is 46 years. Their average length of service with the company is nineteen years. Since October, 1913, wages on the Eastern Massachusetts have increased 117.9 per cent. The cost of living during the same period has increased 60.9 per cent. These and other facts make it appear that these men are well off compared with all other workers in the vicinity no more skilled than are they.

Mr. Wadleigh's comparison of their lot with that of others was not intended to be invidious, to create ill will, but the contrasts he drew were striking. This suggests again the soundness of the contention of the company that "we are paying a decent living wage." It is, of course, commendable to want to live better, but if one cannot manage well what he already has, be the amount large or small, how can he profit by having more? The workman seldom knows how to live judiciously. Often he is proportionately a bigger wastrel than is the so-called man of money. The notion is a mistaken one that ability to spend wisely goes with large earning power or the possession of means. Many men are poor on $10,000 a year. A living wage depends entirely on knowing how to live. And in the present day of inordinate prosperity the art of living seems to be languishing.

On the basis of the remarks of Mr. Vahey, acting for them, one might expect to find the Eastern Massachusetts men constantly upbraiding themselves with the question "Is Life Worth Living" and forgetting that the famous answer of *Punch* to this question was that it all depends on the liver. In the light of many of the recent wage discussions the tear glands of at least one commentator are not stimulated to the extent that there is any semblance of the saline secretions symbolic of sympathy. In other words, despite the able presentation of the cases of the men, there appears to be no need to cry one's eyes out over the plight of labor—particularly platform labor.

Fare and Assessment Fallacies Pricked in New York Bus Report

SEVERAL points made by the Board of Transportation of New York in its report on the pending bus applications are to be commended, but on the whole the report is disappointing. These points relate to the recognition by the board of the need for limiting the length of a bus ride for any given fare and to the recognition—even though stated negatively—of the fallacy of exacting a franchise rental or fee for the privilege of rendering service. The disappointment is that the existing carriers which bid for rights are given such short shrift. City-wide operation is fundamentally sound. But since there is a need for zoning, the borough as a fare unit seems logical. In fact, examination of the routes proposed indicates a probable intention to divide the system into seven physical groups, even though one company receives a city-wide franchise.

There were 106 petitions from 72 applicants. The bound volume in which the matter is reviewed weighs seven pounds and contains 1,088 pages. These figures testify to the complexity of the undertaking before the board. The finding appears to favor the Equitable Coach Company, not now a local operator, but presumably prepared to meet its obligations if the award is finally made to it. The next step to be taken is consideration of the report by the Board of Estimate to determine which, if any, of the proposals is acceptable. After that a form of contract or franchise must be adopted and advertised for fifteen days prior to a final vote by the Board of Estimate on the granting of the franchise. Even after that none of the companies can assemble any tangible assets until a franchise grant is obtained and favorable action upon it is secured by the State Transit Commission. That is the *modus operandi* that must be followed. Understanding of it is essential lest erroneous conclusions be drawn. In other words, the suggestions made are not tantamount to the letting of the grant nor the conferring of operating rights. Far from it.

It was a colossal undertaking, the passing of judgment in this instance. It is, of course, easy to damn a thing of this kind with faint praise. But as said before it is to be regretted that the existing carriers were shown such short shrift. In the best interest of the city they do not deserve it. Condemnation of them for alleged sins of the past does not come with good grace. The criticism does not hold water that the past history of the predecessors of some of the railways which sought operating rights does not inspire confidence in their financial methods. With all due respect to the presumed favorable applicant, does its guarantee really mean anything? Chicanery and manipulation are things of the past—at least the presumption is reasonable that public regulation has made them so, no matter what the desire of the owners may be. If that is not so and the Transit Commission, acting in its regulatory capacity in the interest of the public, is impotent, what is the assurance that there will be no further manipulation, no matter to whom the grant is made?

It is not fair, however, hastily to weigh a matter of this kind. Even though ELECTRIC RAILWAY JOURNAL does not find itself at one with the board, it would be unfair not to acknowledge the magnitude of the task before the board or to give it credit for discerning the two important points previously mentioned. So far as the 5-cent fare is concerned, that unit appears to have been retained for its psychological effect in a city which has been educated over many years to believe that there is a relation between transportation and the 5-cent coin. The recommendations of the board do, however, recognize unquestionably the need of abandoning a 5-cent unlimited ride for buses. Five miles is indicated as the maximum length of haul for 5 cents. The wisdom of this figure itself is dependent on many factors. On some parts of Manhattan Island the density of traffic combined with short riding is sufficient to warrant it. Such a 5-mile limit may not be justified on other sections of a city-wide system where traffic density is less and the riding habit not so great.

Another significant thing, mentioned previously, is recognition of the fallacy of exacting a franchise rental or fee. The city's primary objective is and should be to insure maximum service of the best possible character at a given fare. Any assessment against a transportation agency in the form of a franchise tax limits by that amount the resources available for extension and improvement of service. In short, in this recognition and the recognition of the relation between length of haul and cost of transportation, New York is beginning to show evidence of enlightenment when dealing with a new vehicle even though in the past it has been very much in the dark when dealing with existing forms of local transportation.

Better Tax Laws to Be Sought
Through Nation-Wide Effort

SURVEYS of the tax situation as it affects the electric railway industry indicate that there has been ittle co-ordination of thought in the formation of tax aws. Much work has been done, but generally of a ocal nature. One company, or at best a local group, ften through a state association, has been active at ifferent times. There is little general knowledge of ax matters and no nation-wide attempt to establish tate and local taxes on a basis that would be equitable o properties with large and small net earnings alike.

In this issue the announcement appears of a prac-cally completed adjunct to the committee on special axes of the American Electric Railway Association, n the appointment of advisory members. One out-tanding authority from each state has been selected. he list reveals the names of many prominent electric ailway officials. It is the purpose of the association nd the committee to create through these advisory members a nation-wide organization to promote better ax laws. It is the hope that progress may be made oward establishing not only uniformity of laws, but in eliminating such laws that cause almost a crushing burden on some properties.

As much expense as possible must be curtailed to transportation agencies because the advent of the automobile has created a competitive condition that makes impossible the collection of increased revenue beyond certain limits. Other utilities can pass increased costs on to the user much more readily than transportation companies due to the lack of competition.

There must be no tendency to dodge fair taxes, but an electric railway, faced as it is by today's conditions, can only hope to improve its net through superior service and reduced costs. If the augmented committee is successful in establishing a tax basis that will bring reduction to companies now earning little or no net, the savings will revert to the public manyfold in improved equipment and service.

Attendance at Conventions
Will Bear Analysis

LAST October, at the American Electric Railway Association convention at Atlantic City, there were 3½ manufacturer representatives to every operating man. At the recent Central Electric Railway Association assemblage the proportion was three to one. Other gatherings have brought similar figures to light. Obviously the manufacturers are giving far better support to the conventions than the men who are primarily supposed to be benefited by these meetings.

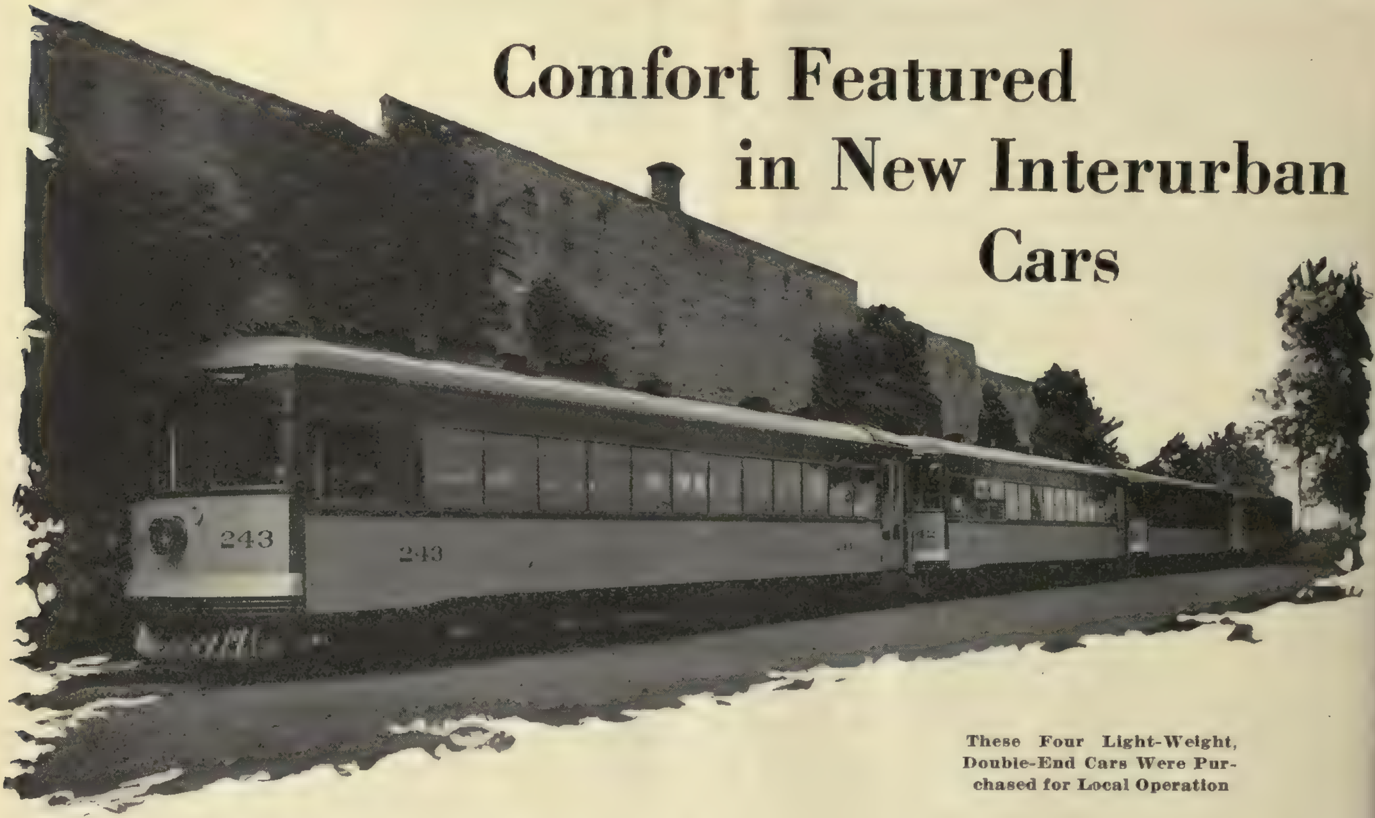
Grant that the producers are actuated by self-interest in attending in such numbers, that they expect to be repaid in the opportunities which will be presented to meet prospective customers. Even so, such a preponderance of manufacturers is an economic fallacy. The cost of sending a large quota of representatives to a convention weighs as heavily upon a manufacturer as upon a railway. The manufacturers are actuated by motives of co-operation as well as profit in this regular attendance at sectional and national gatherings. They have much to give as well as much to receive.

If the railways do not give whole-hearted support to such conventions as are now held, then perhaps there are too many conventions. Better to have 100 per cent attendance at a few gatherings than 50 per cent attendance at a greater number scattered throughout the year. In a house organ of one equipment firm recently appeared this statement:

"Convention expense to the average manufacturer is a formidable item. It can only be justified by affording opportunity to the manufacturer to make contact with a large number of prospective customers. Thus one of three things must inevitably take place: There must be substantially better attendance of operating men or there must be fewer conventions, which presumably would bring larger attendance. If neither of these remedies prevails, then a diminishing support on the part of manufacturers must be expected."

Plain words. Yet they are justified. Constant pressure is brought to bear on the manufacturers to support the local and national meetings to the limit of their ability. After all, they are business institutions, just as are the railways, and convention activity must be mutually profitable to be justified. The forthcoming convention in Cleveland gives every promise of being a noteworthy success in every respect. Attendance of railway men there should help indicate to the industry the value of such meetings.

Comfort Featured in New Interurban Cars



These Four Light-Weight, Double-End Cars Were Purchased for Local Operation

Six New Cars for Chicago & Joliet Electric Railway Embody Many Unusual Elements of Design to Encourage Pleasure Riding—General Dimensions and Appearance of the Interurban Cars Are Similar to Those of Four Double-End Cars Just Received for Local Service Out of Joliet

REPLACEMENT of cars too old for economical operation was the chief reason for the purchase of ten new cars by the Chicago & Joliet Electric Railway. Of this order, six cars of the single-end type are for through interurban service between Joliet and Chicago, while four are double-ended for local service out of Chicago. The ten cars scrapped when the new ones were delivered were all over twenty-five years old. This fact, more than any other, was used by the management in advocating the purchase. Other factors given consideration were the economy of operating a car weighing 24,000 lb. less than the original equipment, or 38,000 lb.; the practicability of one-man operation with new equipment, and the possible increase in riding because of attractive appearance.

Several years ago the city lines were changed over to one-man operation. Two years ago a like change was made on the local interurban runs. The equipment used on the through service between Chicago and Joliet did not lend itself readily to one-man operation and the cost of changing over such old equipment seemed prohibitive.

With the new cars recently delivered, the entire system is now equipped for one-man operation. This is one of the factors in an anticipated operating saving of approximately $30,000 per year. The remainder will come from reduced power bills, because of lighter and more efficient equipment and lower maintenance costs. The latter item is already reflected in the reduction of shop department personnel. One-man operators are paid 5 cents per hour above the scale for conductors and motormen. The estimated saving in energy is about 40 per cent.

All regular service is now given with new cars. However, the company has retained two cars approximately fifteen years old and four cars twelve years old for tripper and extra service. Six still older cars are being retained for special service and for emergency purposes. This gives the company 22 cars of the interurban type, all equipped for one-man service.

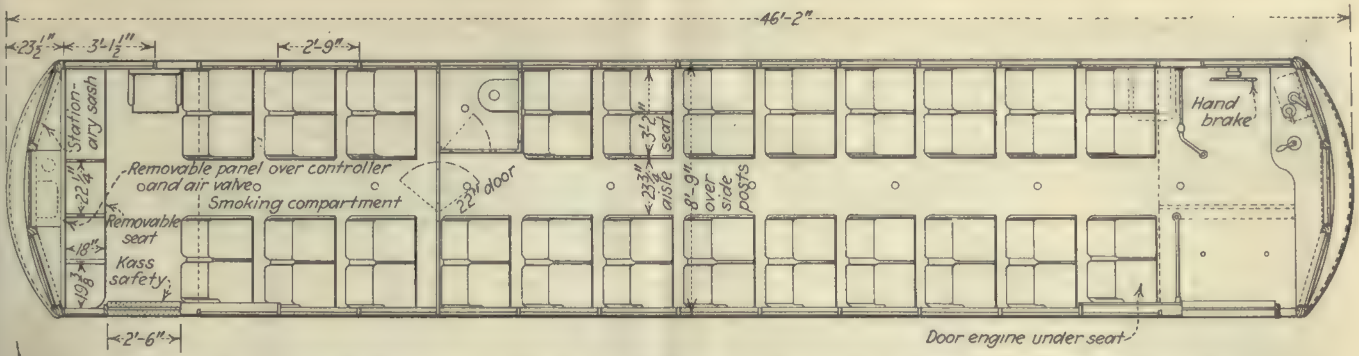
Besides saving approximately $30,000 per year in operating costs, the company expects to attract additional patronage. It is figured that if each of the six new interurban cars will attract one round-trip fare for each trip, the increase in gross revenue for a year will amount to $10,183. This is based on an average of $1.55 for a round trip over the line. Eighteen round trips are run per day between Chicago and Joliet. It is believed that the attractiveness of the car will succeed in building up this new business.

Each of the six single-end cars cost approximately $17,000, or $102,000 for the group. The $10,000 increase in revenue anticipated will more than pay interest on the investment.

On the group of ten cars, including the four double-end cars for local service out of Chicago, the saving in operating expenses is estimated at $30,000. Therefore the return on an investment of approximately $170,000 is well worth $40,000 per year even should the four double-end cars fail to attract any additional riders in local service.

FEATURES WHICH DISTINGUISH THE NEW EQUIPMENT

Streamline effect combined with artistic painting give the cars an attractive appearance. A wide letterboard above the single sash windows is carried from the front to the rear. Sliding doors and folding steps blend with the streamline of the panel below the windows. The



Floor Plan of the Single-End Car, Showing Arrangement of Smoking and Regular Passenger Compartments

arch roof carries ventilators on each side and trolley poles both front and rear. On the front end of the single-end cars and on both ends of the double-end cars are anti-climber bumpers and fenders. The entire appearance of the car is of extreme lowness, accentuating the length and giving the effect of Pullman car design and construction. Both local and through interurban cars were built by the Cummings Car & Coach Company of Chicago.

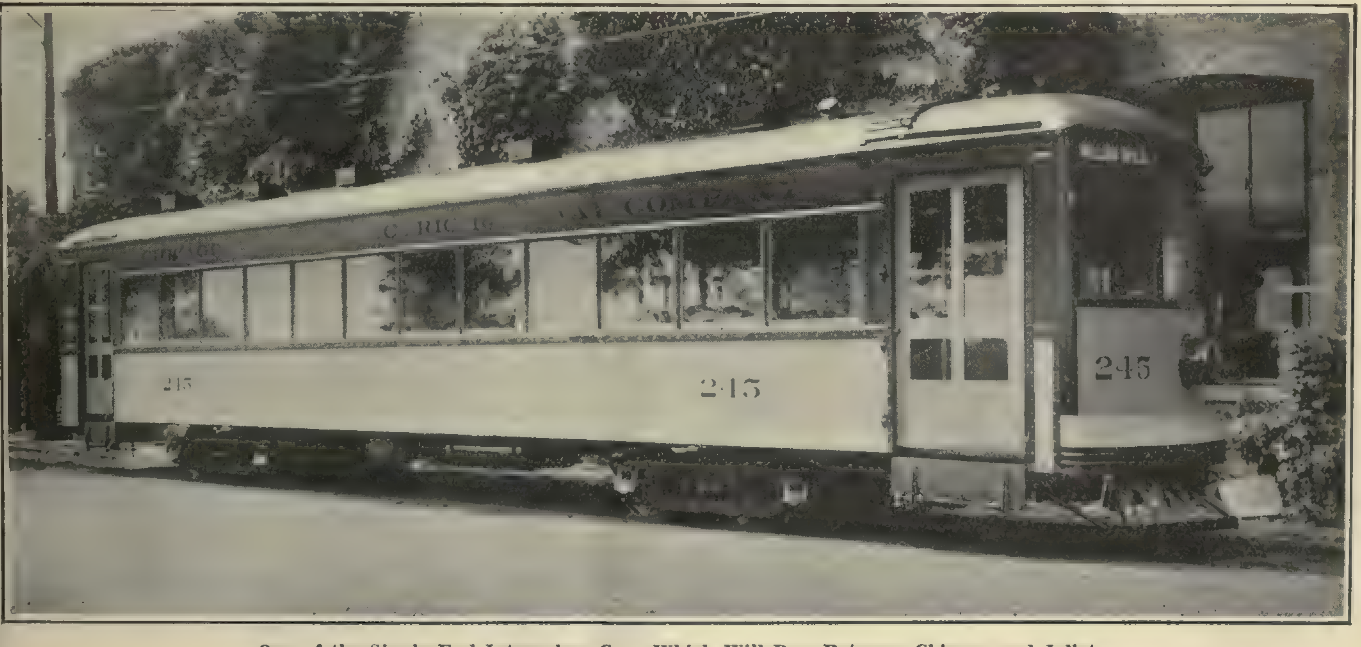
BUCKET-TYPE SEATS IN INTERURBAN CARS

In the single-end, one-man type interurban cars seats are provided for 52 passengers on double bucket-type chairs. These are the feature of the car. They are 38 in. wide, upholstered in green plush, both on the face of the back and seat, while the trimming, back and arms are in genuine green leather. At the rear of the car is a smoking compartment with accommodations for thirteen passengers on the same type of seats, upholstered entirely in leather. Five of these seats are placed across the rear, just in front of the emergency control and air brake cabinet. A cream colored headlining gives a light, clean appearance to the interior of the car, which is finished in mahogany and has green battleship linoleum on the floor. Directly over the center aisle are mounted Pullman type lighting fixtures, while the registers of the Railway Utility ventilators are arranged in staggered formation over the seats. In this car a toilet is located just ahead of the partition separating the smoking compartment from the main part of the car. Advertising racks are located above the panel over the windows. Large hat and coat hooks are placed over each window on this panel.

Control equipment and apparatus are inclosed in a cabinet in the forward end of the car. The motorman's position is at the extreme left, thus furnishing an unobstructed view forward for the passengers. A small bulkhead separates the Agasote headlining of the car proper from the aluminum headlining of the vestibule. Suitable aluminum stanchions are placed at the entrance door and just to the rear of the front vestibule to serve as a dividing partition between the vestibule and the passenger compartment. A curtain may be slid along a rod to protect the motorman from the glare of the interior light. A 38-in. air-operated sliding door is used at the forward end of the car. An emergency door at the rear on the same side of the car may be opened by an air valve in the emergency cabinet to the rear of the rear seat, or by a conductor's valve on the outside of the car.

Single-sash windows with brass sash are arranged to raise. Attached to the bottom sill of the sash are large mesh screens which raise when the windows raise. These serve as protecting guards when the windows are open, but are dropped out of view when the windows are closed. This feature allows for a clear vision through the windows and also facilitates cleaning.

Design of the double-end car is similar to that of the



One of the Single-End Interurban Cars Which Will Run Between Chicago and Joliet

Plush-Upholstered, Twin Bucket-Type Seats Are Used in the Single-End Interurban Cars

The Operators Compartment Shown Here Is Practically Identical on Both the Single and Double End Cars

single-end, with the exception that reversible seats upholstered in green plush replace the bucket-type seats. Both sets of seats were manufactured by the Hale-Kilburn Company. No toilet or smoking compartment is provided in the double-end car. Both types of car are mounted on low-height trucks having 26-in. diameter wheels.

There are two 35-hp. No. 510 Westinghouse motors per truck. A free running speed of 40 m.p.h. and an average operating speed of 22 m.p.h. are obtained with the new units.

Before the new equipment was placed in service on Sept. 7, exhibition runs were made over the line. In addition to this, one of the new interurban cars was allowed to stand for some time in front of the company's offices in Joliet. More than a quarter of the population of that community availed itself of this opportunity to inspect the car.

In the accompanying table are given the principal specifications of the cars, both the double-end and single-end cars following the same general specifications, with the exception of the seats.

SPECIFICATIONS FOR THE CHICAGO & JOLIET CARS

Date order was placed	April, 1926
Date of delivery	August, 1926
Seating capacity	Single-end 52, double-end 48
Weight:	
Car body	19,000 lb.
Trucks	11,000 lb.
Equipment	8,100 lb.
Total	38,100 lb.
Bolster centers, length	22 ft. 6½ in.
Length over all	46 ft. 2 in.
Truck wheelbase	5 ft. 6 in.
Width over sideposts	8 ft. 9 in.
Height, rail to top of roof	10 ft. 9½ in.
Body	All steel
Interior trim	Haskelite, mahogany
Headlining	Agasote
Roof	Haskelite, arch
Air brakes	Westinghouse Traction Brake
Armature bearings	Sleeve
Bumpers	Hedley anti-climbers
Car signal system	Faraday high-voltage
Car trimmings	Statuary bronze
Center and side bearings	Cummings Car & Coach
Control	Double end, K-35-KK
Curtain fixtures	Curtain Supply Co.
Curtain material	Pantasote, doubled-faced
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Gears and pinions	Westinghouse
Hand brakes	Peacock staffless
Heater equipment	Peter Smith
Headlights	Crouse-Hinds, type D.C.F.
Lightning arresters	Westinghouse
Motors	Four Westinghouse 510-A, 35 hp., inside hung
Paint	Sherwin-Williams
Registers	Ohmer
Safety devices	Safety Car Devices Co.
Sanders	Ohio Brass
Sash fixtures	O M Edwards
Seats	Hale & Kilburn
Seating material	Single-end cars, combination plush and leather; double-end cars, plush and all leather
Slack adjuster	Anderson
Springs	Coil and elliptic
Step treads	Kass
Trolley catchers and retrievers	Knutson
Trolley base	Ohio Brass
Trolley wheels	Westinghouse
Trucks	Cummings No. 62
Ventilators	Railway Utility
Wheels	Davis Steel Co., 26 in.
Energy-saving device	Sangamo economy meter

Two University Courses Offered in Public Utilities

At least two universities are offering this year new or expanded courses in public utilities. One, a four-year course at the University of Illinois, is under the direct charge of a professor who occupies a chair in the economics of public utilities, recently endowed by the Hon. William B. McKinley. The course is open to graduates as well as to advanced undergraduates. There is also a course for graduate students only. Both lead to degrees. Credit scholarships and fellowships are available to students who give evidence of ability and promise.

In addition a series of afternoon and evening courses in public utilities is being offered this year by the Northwestern University of Chicago, emphasizing the economic, financial, legal and administrative principles in utility operation. They are given in the afternoon and evening to permit the attendance of individuals who are engaged in work during a part of the day, and it is believed that the courses will therefore appeal to many connected with the financial and executive departments of utilities. Several of these courses are given by members of the Institute for Research in Land Economics and Public Utilities, which moved to Chicago on July 1, 1925, and became affiliated with Northwestern University.

The courses in both universities are indorsed by the Joint Committee on Co-operation with Educational Institutions of the Gas Association, State Electric Association, Electric Railway Association, Telephone Association and Committee on Public Utility Information, all of Illinois. The chairman of this joint committee is Britton I. Budd.

Many Variables Affect Energy Consumption by Electric Railways

Checks of Energy Consumption per Car Unit a Valuable Aid to Management—Only by Careful Analysis and Evaluation of the Many Variables Encountered Can the Operating Efficiency Be Adequately Checked

By J. T. Lake
Economy Electric Devices Company, Chicago

PROPER analysis of the variations in energy consumption which follow changes in operating practice on an electric railway is essential to an accurate determination of the value of any supposedly more economical method of operation. So many variable and interwoven factors enter into electric railway performance that it is difficult to set off exactly the effect produced by a change in any one of them. Schedules may be speeded up, thus making a saving in platform hours at a worth-while increase in energy and maintenance cost. When additional copper is strung to decrease line losses, the management may be disagreeably surprised to find an increase in energy used for the same car-miles operated, due to better schedule adherence.

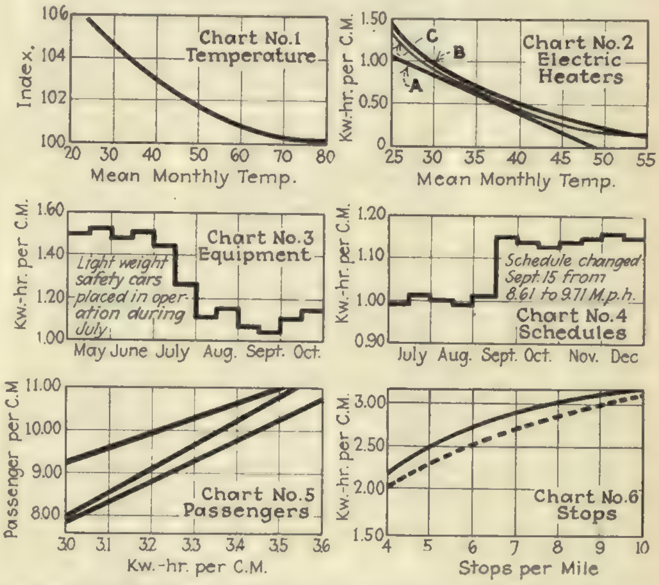
Substantial savings in energy consumption and power demand have been made on a great many properties by increasing the motorman's operating efficiency. If conditions remain the same over a period of years, these savings are evidenced by a continued decrease in the monthly power bills. On any given property, however, conditions very rarely remain the same for any length of time, and hence it is necessary to make proper allowance for the changes that occur. When facilities are available for measuring the energy consumption at the car, it is a comparatively simple process to evaluate readily the effect of the variables encountered.

The more important of the variables which affect energy consumption are as follows: Temperature, electric heaters, equipment, schedules, distribution system, miscellaneous use of power, number of passengers, number of stops, street traffic, loading of system and efficiency of operation by trainmen. The effect of most of these variables can be determined by an analysis of past traffic statistics and by applying the corrections obtained to the current figures. These corrections, together with the actual energy consumption at the cars, will supply all the data necessary to compensate properly for changes as they occur.

Temperature Affects Energy Consumption

With decreasing temperature, as in the winter months, the energy consumption per car increases. This increase is the resultant of many factors, such as changing resistivity of the electrical circuit, increased friction, bad rail conditions due to leaves, mud, ice and scum, increased length of stops caused by slower loading of passengers, etc. By plotting a curve between kilowatt-hours per car-mile and average monthly temperature, this relation can be shown graphically. Of course care must be taken that other variables, such as electric heat, schedules, passengers, etc., are eliminated. Chart No. 1 gives a typical temperature-kilowatt-hours per car-mile curve. This curve is based on five years operation on a property which has no electric heaters on its cars. Analysis of the statistics for only the non-heat months on other properties using electric heat substantiate these figures.

Chart No. 2 shows the amounts of energy consumed per car-mile for electric heat at various mean monthly temperatures. Two of these curves represent actual data, and one (C) is calculated from power statistics, corrected for the other variables which entered into the figures.



Effect of Variables on Energy Consumption by Electric Cars

In Chart No. 1 is shown the increase in energy for propulsion as the temperature decreases. In Chart No. 2 the energy used by electric heaters is plotted against outside temperature. Curves "A" and "B" are based on actual tests. Curve "C" is calculated.

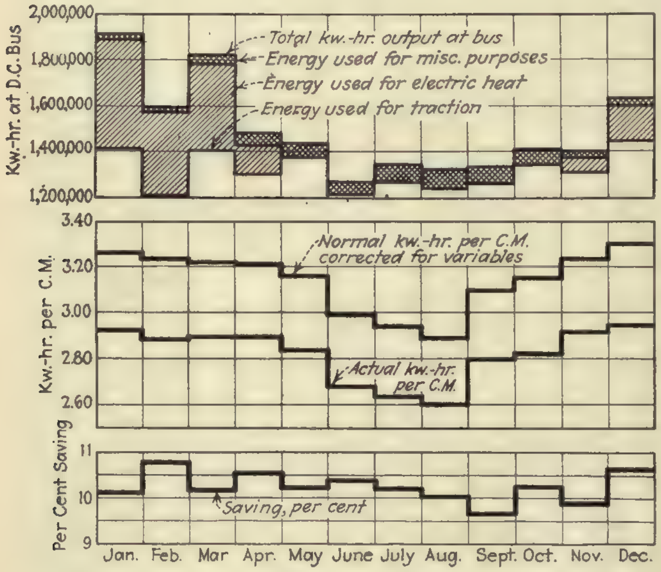
Equipment and schedules have important bearing on amount of energy used. Chart No. 3 shows the result of changing from rebuilt single-truck cars to modern safety cars on one small line. Chart No. 4 illustrates effect of increasing schedule speed.

Average number of passengers per car-mile and number of stops are closely related in their effect on energy consumption. Chart No. 5 is platted between passengers per car-mile and kilowatt-hours per car-mile. Chart No. 6 shows the relation between stops and energy. The solid line was derived from speed time diagrams and the dotted line represents actual tests on approximately the same equipment.

Changes in equipment usually involve the adoption of more efficient motors and cars and the retirement of obsolete rolling stock. A theoretical figure showing the change in energy requirements can be obtained from speed-time curves, but as this method assumes a certain condition of the rolling stock, it is more or less inaccurate, particularly when used for older equipment. Where meters are available on the cars it is of course simple to obtain these figures from the actual readings of the meters taken just before and just after the change. If an entire division or line is changed over at one time, and the energy supplied to that section is metered at a substation, the change is readily noted on the substation meters. However, it is seldom that a property is fortunate enough to change over the equipment on any one division completely. An example is shown in Chart No. 3 of the effect on energy consumption of changing the equipment on one small line from single-truck rebuilt cars to modern one-man cars.

SCHEDULES HAVE IMPORTANT EFFECT ON ENERGY

When schedules are changed the energy requirements for the line under consideration also change. Most of the schedule changes of recent years have been made to speed up the service, which naturally increases the energy required. Chart No. 4 gives an example of the effect of a change in schedule speed from 8.61 to 9.71 m.p.h.



Analysis of Energy Consumption for a Year on a Typical Electric Railway Property

Above is the monthly fluctuation in various divisions of the power bill. In the center, the importance of correcting for variables in checking energy consumption figures is illustrated. Below is the saving made by use of car meters to check trainmen.

The effect of any changes in the distribution system can be determined by a comparison of the unit energy consumption at the busbar and at the car. The ratio between the two does not necessarily indicate the true efficiency of distribution, as there may be some miscellaneous use of energy for other than car operation. However, if this does not change materially for any given period, a change in the distribution system can be checked by the ratio between the unit energy consumption at the busbar and at the car.

Most properties use a very appreciable amount of d.c. power in their shops and carhouses. Considerable amounts of power are used also for track grinders, arc welders, and other track and maintenance tools. In a great many cases all of this power is properly metered, or is accounted for by estimates based on tests and prorated according to time of operation. On some properties the amount used for these purposes is quite heavy and during the season of track construction varies considerably. It is advisable, therefore, to make proper allowance for this, both for accounting purposes on miscellaneous work and in analyzing the energy used for passenger car operation.

An increase in the density of passenger traffic, i.e., in passengers per car-mile, is usually accompanied by an increase in the unit energy consumption. This is particularly true where the traffic density is comparatively light, as additional passengers mean additional stops. Even where the traffic density is very heavy, an increase in passengers per car-mile will result in some increase in unit energy consumption, not so much in this case because of an increase in the number of stops as of increased length of stops and, to some very slight extent, the weight of passengers. This latter factor is much more noticeable where modern light-weight cars are in use because the passenger load is a greater proportion of the total weight. On Chart No. 5 are given curves from three large cities which show very clearly the effect of increased passengers per car-mile upon the kilowatt-hour per car-mile consumption. This relation, of course, will vary with local conditions.

NUMBER OF STOPS ALSO IMPORTANT

The number of stops has a very important effect on unit power consumption. This factor is influenced largely by the passenger density and is usually considered with this figure. However, knowledge of the effect of eliminating stops is often desired by managements in order to justify such reduction. These data can be obtained either through speed time curves or by actual test. Chart No. 6 shows the relation between number of stops and energy consumption for a particular class of equipment. The solid line was derived from speed time diagrams. The dotted line is based upon test on approximately the same equipment.

With the speedily increasing density of traffic on the streets, operators have found it more and more difficult to maintain their schedules, which of course means a greatly increased unit energy consumption. There seems to be a fairly uniform relation between automobile registration and energy consumption, and this is shown most clearly over a period of years by the gradual increase in energy used, even after all possible allowances have been made for other factors.

Considering the entire system of an electric railway as an electrical unit, it is obvious that load factor will play an important part in the over-all efficiency. For instance, if it is assumed that the entire feeder system is energized, but that no cars are being run, the energy used is the total standby consumption with zero car-miles as a divisor. This gives the highest (infinite) kilowatt-hours per car-mile. On the other hand, if we assume 100 per cent loading of the electrical system, with its various units, such as generators, motors, copper, etc., working at maximum efficiency, the lowest figure of kilowatt-hour per car-mile is obtained. On most properties the fluctuations from month to month, or year to year are not severe enough to cause the variations in this factor to be seriously reflected in the energy use per car-mile. But instances have arisen where, due to changing conditions, the traffic load has been considerably reduced on a property which was originally laid out for a certain density of traffic. The effect of the load factor is then quite noticeable. If the energy is metered at the cars, it is not necessary to take this factor into consideration in checking the effect of operating improvements, as the results are obtained directly at the car meters. But where it is necessary to determine the effect of changes in operating conditions by measurement at the busbars, it is important to give this factor its due weight.

The manner in which the trainmen operate their equipment is the factor which has the greatest effect upon energy consumption of an electric railway. Reductions as high as 25 per cent have been obtained and maintained through the proper checking of their performance. The average reduction is usually well over 10 per cent, and where the conditions have remained constant, are easily discernible over a long period of years. Unfortunately, most properties have undergone more or less change in their operating conditions, and it then becomes necessary properly to interpret the effects of these changes when endeavoring properly to determine just how much energy saving has been made.

The usual practice in an Economy meter installation is to obtain an "As was" or normal figure, prior to the actual placing of the meters in service, to determine just what the entry consumption normally would be. This is most conveniently done by blindfolding the meters and taking midnight readings covering a period of a week, together with the corresponding mileage. This gives a figure for the blind or normal energy consumption for each type of equipment and each line. Then these results can be compared with the corresponding power house readings, and from these two figures a base can be derived from which to determine the future performance of trainmen. This base figure may be corrected for any changes which occur in operating conditions, as indicated in the preceding paragraphs. The difference between the actual energy used and this corrected base or blind figure gives the amount of energy which has been saved through the checking of car operators.

Rigid Frames Feature Electric Locomotives for Virginian Railway

Layout of Apparatus on These 11,000-Volt, Single-Phase Units Dictated by Adoption of Solid Framing Instead of Articulated Type—Several Extremely Heavy Pieces Had to Be Anchored to Prevent Shifting Under Severe Strains Incident to Buffing Shocks

By C. C. Whittaker
Railway Equipment Engineer Westinghouse Electric & Manufacturing Company

WHEN an electric locomotive is to have a maximum power output for minimum weight, the designer is at once confronted by a number of problems which must be solved by compromise. Heavy pieces of equipment must be located near the center of the locomotive and equally disposed about the center lines in order to minimize undesirable oscillations, either rolling or swinging, commonly called "dumbbell" effect. Current collectors must be located so as to minimize the effect of side displacement on curves. Equipment must be arranged so that minimum length of cab results and hence minimum length of cable runs and pipe. High-tension apparatus, where possible, should be inclosed in a grounded compartment as a safety measure. A minimum amount of inflammable material should be used and cable should be protected either by a flameproof braid, conduit or ducts. All equipment must be installed so as to offer the maximum facility for inspection, maintenance and removal for heavy repairs without greatly disturbing adjacent parts.

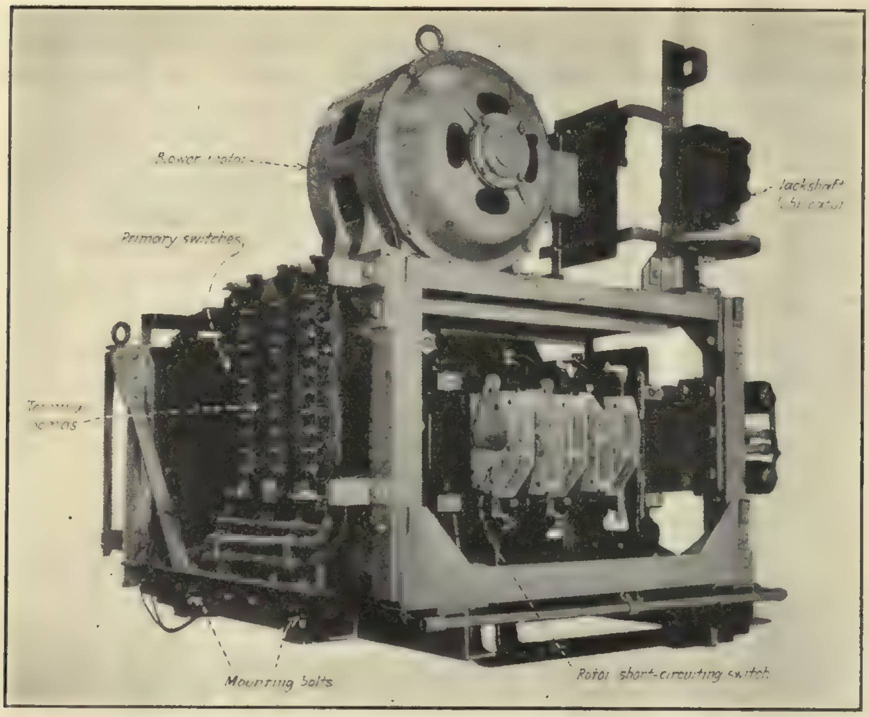
The Virginian Railway locomotives, which are used on the electrified section of that railroad between Mullens, W. Va., and Roanoke, Va., for haulage of heavy coal trains, were designed with a rigid frame or backbone steel casting which transmits all of the buffing strains, contains the bearings for the traction motor rotors, and for the jack-shafts. The supports for the electrical equipment and the cab housing this equipment are built directly upon this casting. The action in this design on the electric control apparatus had not been proved out previously by service, as former designs had the electrical apparatus mounted in a cab which was in effect spring-borne.

The arrangement in this present design is to give a massive bedplate on which the electrical equipment is supported. This large mass is not so subject to vibrations, due to inequalities of the roadbed, etc., as were the less heavy structures used previously. It does, however, take a greater share of the buffing impact, inasmuch as any bump is transmitted directly to the backbone frame or apparatus support. Earlier designs in which there are separate trucks and a cab mounted thereon by center pins have the buffing strains transmitted to the equipment in a less direct and more resilient path.

In the new design the liability of failure is transferred from a more or less continuous source of vibration to one infrequent but more severe. Realizing this, special care was taken in the manner of fastening the heavy pieces of apparatus to the locomotive frame to resist both the shear of their support and the tendency to overturn when maximum buffing strains are encountered.

The heaviest single piece of apparatus, the phase converter, weighing 30,832 lb., is held down by twelve 1½-in. bolts and in addition is keyed against a longitudinal displacement by being wedged within a depressed portion of the locomotive frame casting.

The second largest piece, the main transformer, weighing 25,000 lb., offered a new problem, inasmuch as it is of an oil-insulated, forced-cooled type. As hot oil is extremely difficult to hold by any ordinary form or riveted or calked joint, it was decided to build the



The Apparatus for the Control of One Traction Motor Is All Assembled in a Complete Unit

transformer tank as a cylinder with one triple-welded, vertical seam, and with the bottom flanged, riveted and welded to the sides. These are shown in accompanying drawings. In addition, the bottom is reinforced by I-beams, on which the weight of the transformer itself is carried. This cylindrical structure, when fastened securely at the base, has sufficient rigidity to withstand shocks met in service notwithstanding the high center of gravity of the complete transformer. It is held down by eight 1½-in. bolts and is further wedged between fitted lugs to guard against longitudinal displacement.

The transformer projects through the roof and has its top removable for inspection. All leads, both high and low tension, are taken through special insulating bushings in the side of the tank which are properly shielded from the weather. Where the low-tension copper strap leads that are cleated to the cab structure join to the transformer terminals, flexible copper braid leads are interposed to accommodate any slight motion that may exist between cab shell and transformer tank.

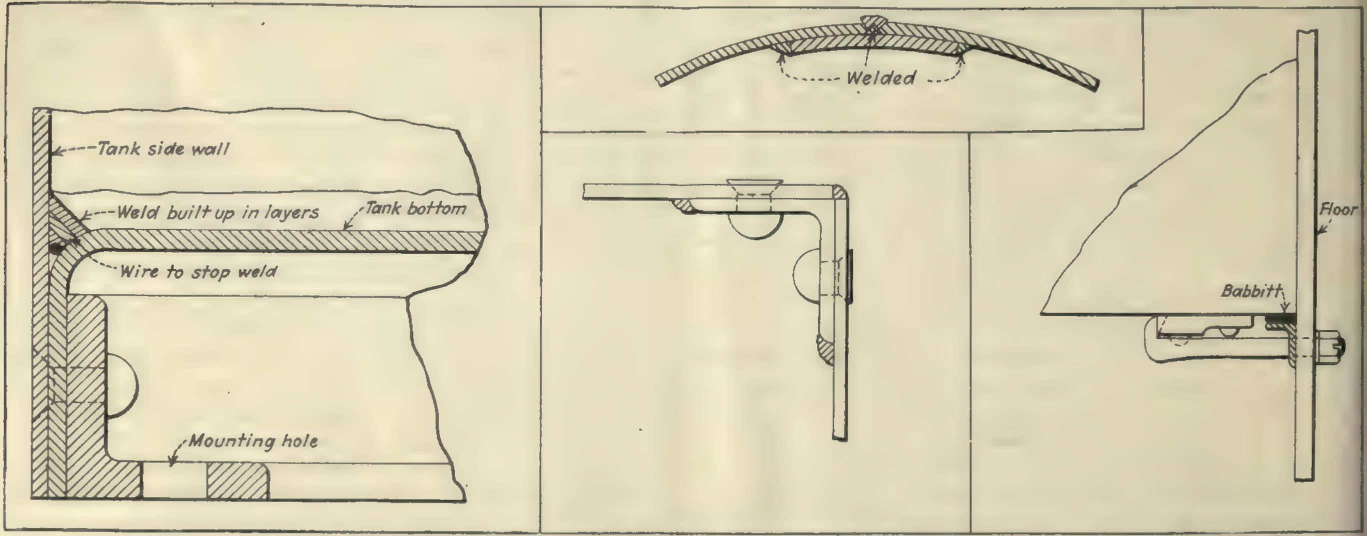
The third heaviest piece of apparatus, the liquid rheostat, weighing 21,900 lb. complete, has a relatively large base and a low center of gravity. Its tank is rectangular, with corners reinforced by inside angles riveted and triple welded. The whole tank rests on the floor of the cab and is surrounded by an angle frame riveted to the floor. The space between this angle frame and the rheostat tank is filled with babbitt. The tank is held down by "J" bolts at each end, as shown in one of the diagrams. Flexible cable is employed for leads to the rheostat.

On account of the rigidity of the rheostat and transformer tanks and the relatively flexible cab superstructure, both of these tanks, where they project through the roof, have an opening of ½ in. all around, properly shielded from rain. This allows for possible sway so that undue strains will not be imposed on the tanks by movement of the cab.

Three-inch flexible steel pipe is used to conduct the oil from the transformer to the circulating pump and radiator. The use of this type of pipe obviated the necessity of bending stiff pipe to exact shape so that when its ends were drawn tight in final position no strains would be set up. It also decreased the liability of leaks at pipe joints due to vibrational strains.

An assembly of apparatus for the control of one of the traction motors, shown in one of the illustrations, is mounted directly on the frame of one of the traction motors. It is held in place by four bolts and is interchangeable with any other similar assembly. It includes all the control items common to each traction motor, such as the blower outfit, motor primary switches, pole changeover, short-circuiting switch, terminal boards, and jackshaft lubricator.

Since these motive power units may be run singly,



Top—Section of Triple-Welded Vertical Seam Transformer Tank. Left—Method of Riveting and Welding Bottom of Transformer Tank to Sides. Center—Riveted and Triple-Welded Angles Reinforce Inside Corners of Liquid Rheostat Tank. Right—Method of Fastening Liquid Rheostat Tank to Floor of Motive Power Unit or in groups of three or four, special attention was given to the operation of the pantographs from the standpoint of safety. When two or three cabs are used in multiple, a bus line extends the full length of the locomotive. This bus line is energized whenever any one pantograph is against the trolley wire. Consequently, if it becomes necessary for a man to go onto the locomotive roof, his first act before ascending is to lower all pantographs and then to throw in the bus line grounding switch. This feature protects the attendant while on the roof from the accidental release of any pantograph. If for any reason a pantograph should become disabled it can be conveniently disconnected from the bus line and locked down by means of the same plug and flexible cable that is used to connect the pantograph to the bus line. When in case of an emergency condition a pantograph must be unlatched or pulled down from a position on the ground, a 15-ft. impregnated wood hook stick is provided. This stick is normally carried in a length of conduit on the side of the locomotive and is thus always dry.

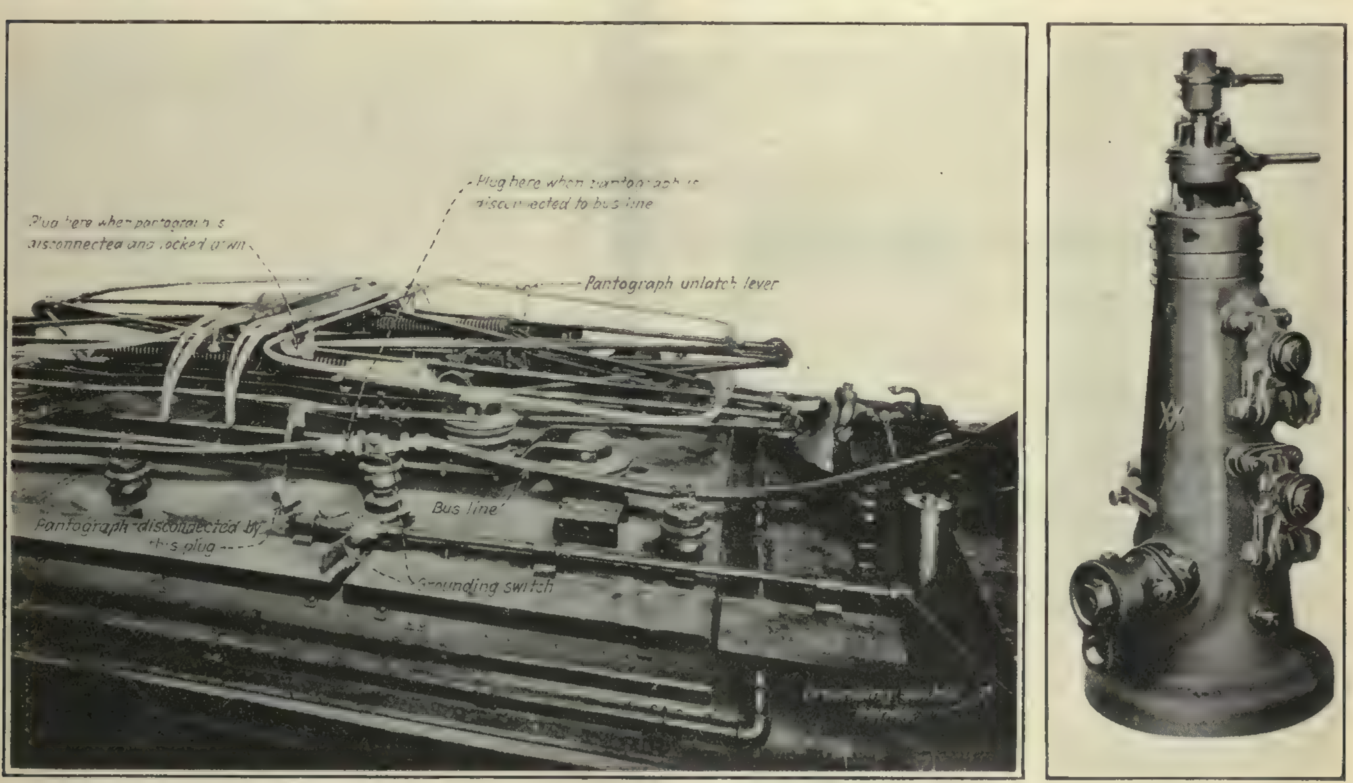
These locomotives are at present operating under an 11,000-volt trolley wire. All wiring and insulation in connection with the pantographs, however, has been laid out suitably for subsequent operation on a 22,000-volt line. Provision is also made so that a second pantograph may easily be added to those cabs operating as single units.

Sand boxes are filled from the outside. By this means much of the undesirable sand dust is prevented from coming in contact with the electrical equipment.

Eight ammeters are required in front of the engineer to indicate the performance of the complete locomotive when four cabs are operating in multiple. Usually, however, three units comprise a complete locomotive. These meters are of the edgewise type and are arranged in two rows of four each, one above the other. By means of these meters the engineman can tell the load on each unit, and therefore regulate the proportion of the total that each is taking. The meters also indicate when any of the units slips its drivers.

All auxiliary motors are controlled by a pneumatically operated remote-controlled cam switch group. Each individual motor is provided with a quick-break knife switch which is used merely for disconnecting. In order to guard against the improper manipulation of these switches when alive, a set of guards is provided which completely incloses each switch and its fuses, with the exception of the handle.

The air-brake piping at the engineer's stand was greatly simplified by the development of the K-14-A brake valve pedestal bracket. Ducts were cast in the walls of the pedestal to take the place of pipes which on other equipments connected to the brake valve to feed and reducing valves, brake pipe cutout cock, equalizing reservoir and other details. The space within the pedestal became the equalizing reservoir. By means of this pedestal construction a large amount of difficult and unsightly pipe fitting was made unnecessary, eliminating in all approximately 40 threaded connections and resulting in a more reliable system of air brake piping.


Plug here when pantograph is disconnected and locked down
Plug here when pantograph is disconnected to bus line
Pantograph unlatch lever
Bus line
Pantograph disconnected by this plug
Grounding switch

At Left—The Virginian Locomotive Pantograph Includes a Number of Special Features. At Right—The Air Brake Valve Pedestal Contains All Air Control Equipment

Red Coats to Protect Track Greasers

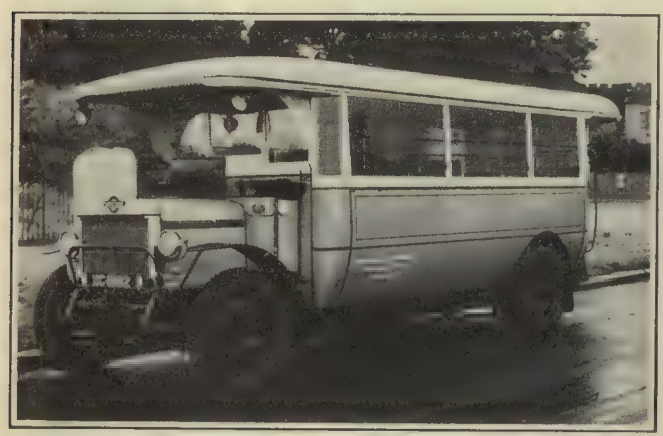
THE Wisconsin Public Service Corporation, Green Bay, Wis., has outfitted its track greasers with red coats. These coats serve to make the workmen more conspicuous and also to distinguish them from ordinary pedestrians. During dark days the track greasers also attach red lanterns to their grease pails for further protection. During several months use the coats and lanterns have proved to add largely to the track greasers' safety.

New Buses for London Feeder Service

TO ENCOURAGE traffic for the extension of the City & South London Electric Railway from Clapham to Morden, Surrey, the London General Omnibus Company has arranged to run new and luxurious single-deck buses on pneumatic tires to six districts beyond the Morden terminus. The forecourt of the station has been planned for the accommodation of buses.

The new type of bus, which is described at length in the *Tramway and Railway World* for Aug. 19, seats 22 persons, sixteen in cross seats and six in longitudinal seats at the rear end. All seats are of a new armchair pattern, assuring each passenger ample room and comfortable riding. The cushions are spring-filled, padded and upholstered in antique green leather. The center of the back has a spring squab which is separately fixed. Surrounding this is a spring roller which fits the passenger's back and prevents any tendency to side roll when the vehicle is in motion.

A semi-elliptic roof is used. All windows are of the half-sliding type and three center pivot ventilators also are provided. The interior paint work is white, the exterior being in French gray with wine color lining. A standard "K" type chassis with pneumatic tires carries the body.



Single-Deck Two-Man Bus Recently Developed by the London General Omnibus Company for Feeder Service

Until the railway extension opens for traffic at the end of the summer eleven of the buses are working from Wimbledon station to Worcester Park station, Cheam and Burgh Heath as Routes 155, 156 and 164. Nine more of the machines are in course of construction.

The new extension will be a boon to South London and the outer suburbs, as it will serve a population of about 300,000 persons and give through service to other routes on the Underground system. The journey from Morden to Charing Cross, now occupying 50 minutes, will be made in 29 minutes, a saving of 21 minutes.

Accident Prevention Plan in Effect in Oklahoma City

A PLAN intended to reduce the number of accidents to employees and the public has been put into effect by the receivers of the Oklahoma Railway, Oklahoma City, Okla. Trainmen and bus drivers have been divided into eleven teams of eighteen men each and the team having the best safety record at the end of each month will receive $100. The trainmen decide whether the entire prize will go to the team making the best score or whether a part of the money shall be awarded to the second place team. Receivers of the Oklahoma Railway report that the employees have entered into the spirit of the contest and that the riders are showing a desire to co-operate in the accident prevention work.

Popularity Cycle of Street Car

Baltimore People Are Finding that It Pays to Ride the Cars—New Equipment, Greater Comfort and Speed Contributing Factors

REASONS why street car riding in Baltimore is increasing are set forth in an interesting statement made public by the United Railways & Electric Company, Baltimore, Md. The company says that people are finding out that it pays to "Ride the Cars." During the first six months of this year there has been an increase of nearly 4 per cent and the company has been able to furnish 9,145,832 more seat-miles from Jan. 1 to May 31 than it was able to furnish in the corresponding period of last year. Since September of last year, the company says, it has been able to drop nearly 100 more or less obsolete cars from its equipment and, as a result of an intensive car construction program, coupled with a scientific study of each of the company's 35 lines, in which running time, layovers, traffic and peak loads were thoroughly checked up, there have been many improvements. These include the adoption of a system of interline operation whereby cars assigned to one line may be put to work on another line on short notice to meet rush-hour emergencies, resulting in ability to make double use of many cars when most needed; greater frequency and less wasted car-miles, substitution on one line of cars seating 47 passengers for cars seating 36, substitution of two lines of cars seating 36 passengers for cars seating 30, doubling the number of 60-passenger trail cars on one line; completion of 26 articulated two-car trains, with six more probably ready in September, and completion of eleven permanently coupled two-car trains.

In answer to the question "Why is street car riding increasing," the company makes some pertinent comments on periods of popularity through which the various transportation agencies pass. The trolley car, having lived down the stigma of "nobody rode the street cars unless they had to," is approaching a new cycle of popularity, but from a different angle. In the good old days the electric cars were used for pleasure only and the favorite seat was right up behind the motormen, "with the breeze booming full in your face and the track through the summer countryside slipping away right in front of you beneath the rolling car." Then shortly after the automobile was heralded as the invention of the hour and was rushed into service on the slightest pretext. But now another cycle has swung around.

The statement of the company concedes the greatness of the automobile—"for benefits to mankind neither the airplane nor the radio compare with it. But people in big cities are now coming to the conclusion that they are more comfortable downtown at business if they leave the automobile at home. And so the cycle of popularity comes around again for the street car."

Cleveland Railway Extends the Use of Automatic Substations

THIRD ARTICLE

The Remote and Supervisory Control Systems Were Developed for Economy of Operation and Ease of Load Transfer—Entire Control Centers in Company's Main Office, Where the Load Dispatcher Is at All Times in Touch with the Whole Power Conversion System

By L. D. Bale
Superintendent of Power the Cleveland Railway

The Heart of the Supervisory Control System
At this desk the load dispatcher is in communication with all the substations and has before him complete knowledge of what is taking place

MOST important among considerations leading up to the development of the remote control and supervisory system as used on the Cleveland Railway were (1) the necessity for correlating the operation of automatic substations one with another and with those manually operated so that the most economical operation of individual stations would result; (2) to insure the ability to shift or transfer load at will in the event of station or system trouble; (3) control the direct-current feeders in the automatic substations and facilitate the clearing of grounds wherever possible by the "burning-off" process. It is only by the use of such a scheme that the demand of the management for maximum insurance against service interruptions involving either individual feeder sections, local areas or the system as a whole could be met.

As a rule the dispatching of load on a system depends on the dispatcher being in immediate touch with the operatives of the various substations under his control. In this manner he is in a position to issue instructions to them, based upon knowledge of the condition of the system, and is able to handle emergencies fairly well.

With the advent of the automatically controlled substation the dispatcher would have neither the necessary information relative to the operating conditions of the stations or system nor means at his command for changing them. The scheme of remote and supervisory control places the dispatcher in a position where he is at all times fully informed as to the condition of the system and the occurrence of any trouble, such as with a.c. and d.c. feeders and converters. He has at his command facilities whereby, at a moment's

Remote Control Key Plate

Through this device the load dispatcher can operate the mechanism in the various controlled substations

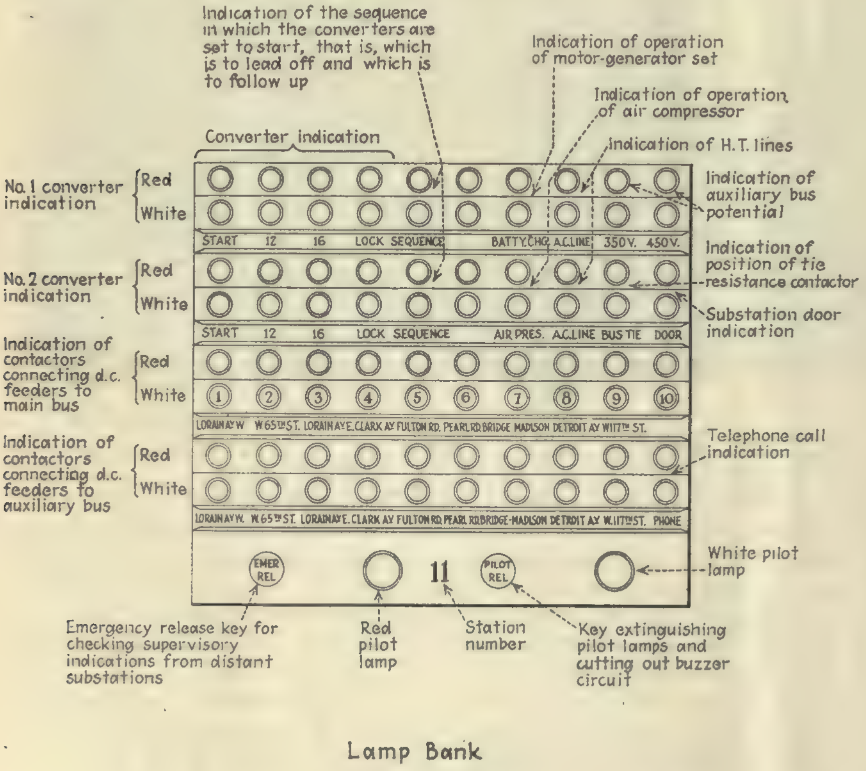
notice, he can bring about changes in the operation of any station, stations or equipment necessary to rectify conditions which may exist.

CONTROL CENTERED IN EXECUTIVE OFFICES

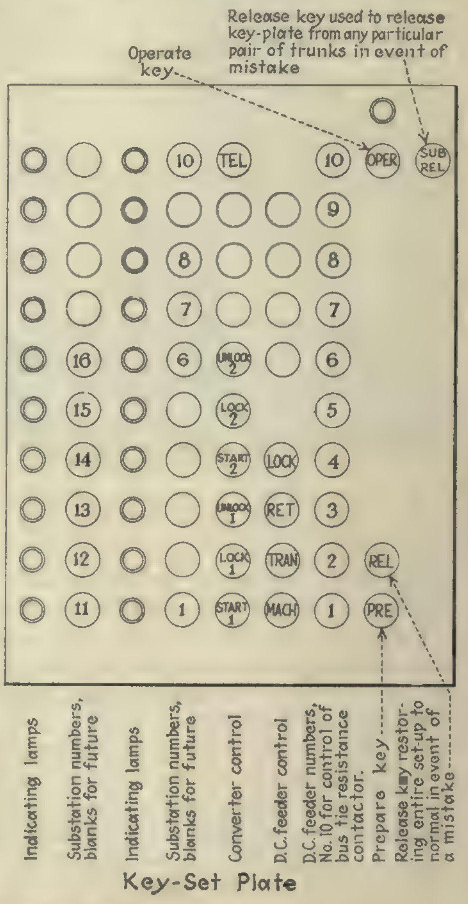
The dispatching center is located in the executive offices of the company, which are situated at the approximate geographical center of the system. The dispatcher's desk as now installed provides facilities for the control and supervision of fifteen automatic substations. Its compactness may be seen from the illustration. A duplicate of the present desk will be installed for proposed stations.

The cordless telephone board, seen at the left of the control board, enables the dispatcher to communicate directly with the operators of the manual stations. Connection from the dispatching center to each automatic substation is obtained through two leased pairs of underground telephone conductors. One pair of these wires is used for remote metering and also acts as a common side for the control and supervisory system, the other for the opposite sides of the signal and control circuits. Telephone communication is had through condensers and repeating coils over the two wires of the latter pair. The single-line diagram illustrates the relays and the principal elements comprising this system.

The turret or vertical portion of the desk is sectionalized so that each substation is represented by a group of red and white lamps and a graphic ammeter. A


Indication of the sequence in which the converters are set to start, that is, which is to lead off and which is to follow up
Indication of operation of motor-generator set
Indication of operation of air compressor
Converter indication
Indication of H.T. lines
No. 1 converter indication
Red
White
Indication of auxiliary bus potential
START 12 16 LOCK SEQUENCE BATTY.CHG. A.C.LINE 350V. 450V.
Indication of position of tie resistance contactor
No. 2 converter indication
Red
White
Substation door indication
START 12 16 LOCK SEQUENCE AIR PRES. A.C.LINE BUS TIE DOOR
Indication of contactors connecting d.c. feeders to main bus
Red
White
1 2 3 4 5 6 7 8 9 10
LORAIN AV. W. W. 65TH ST. LORAIN AV. E. CLARK AV. FULTON RD. PEARL RD. BRIDGE MADISON DETROIT AV. W. 117TH ST.
Indication of contactors connecting d.c. feeders to auxiliary bus
Red
White
Telephone call indication
LORAIN AV. W. W. 65TH ST. LORAIN AV. E. CLARK AV. FULTON RD. PEARL RD. BRIDGE-MADISON DETROIT AV. W. 117TH ST. PHONE
EMER REL
11
PILOT REL
White pilot lamp
Emergency release key for checking supervisory indications from distant substations
Red pilot lamp
Station number
Key extinguishing pilot lamps and cutting out buzzer circuit

Lamp Bank


Operate key
Release key used to release key-plate from any particular pair of trunks in event of mistake
10 TEL 10 OPER SUB REL
9
8 8
7 7
16 6 UNLOCK 2 6
15 LOCK 2 5
14 START 2 LOCK 4
13 UNLOCK 1 RET 3
12 LOCK 1 TRAN 2 REL
11 1 START 1 MACH 1 PRE
Indicating lamps
Substation numbers, blanks for future
Indicating lamps
Substation numbers, blanks for future
Converter control
D.C. feeder control
D.C. feeder numbers, No. 10 for control of bus tie resistance contactor.
Prepare key
Release key restoring entire set-up to normal in event of a mistake

Key-Set Plate

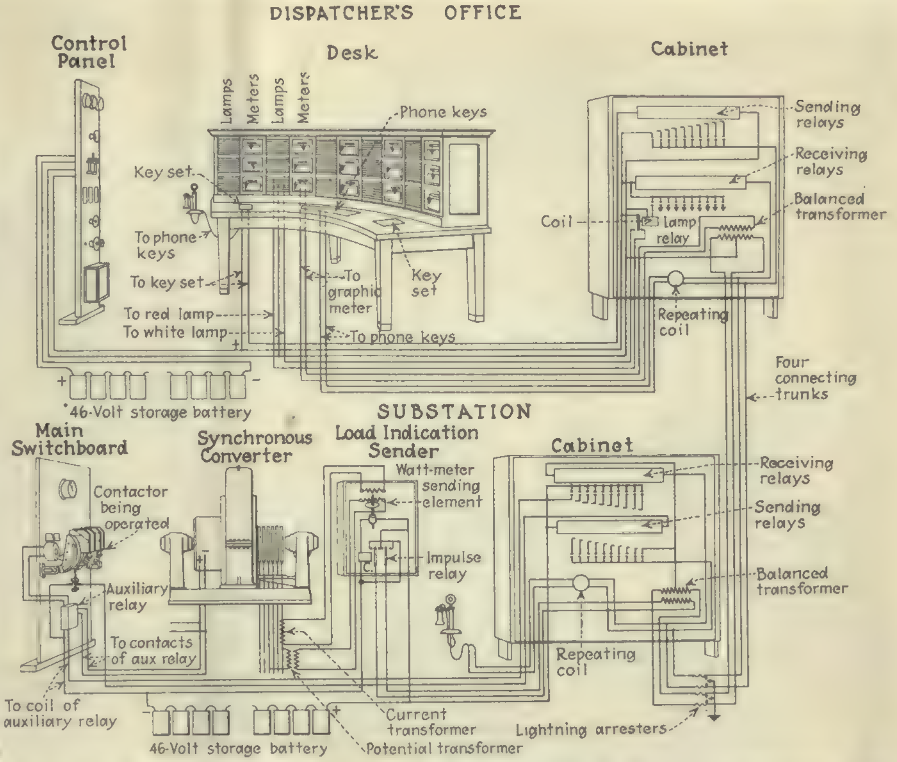
Schematic Diagram of the Remote Control Key Plate and Lamp Bank

By depressing the proper key a code is automatically set up at the relays in the load dispatcher's office, which is in turn automatically forwarded over two of the four control wires to the proper substation. This view indicates the diagrammatic plan of the lamp bank on which the various functions are indicated in the load dispatcher's office. One of these lamp banks is used for each substation automatically controlled from the load dispatcher's office. At present in the Cleveland Railway load dispatcher's office there are ten of these lamp banks on the vertical portion of the board. When a converter is started the operator may observe from the flashing of the lamps the sequence of the operations as they are performed. Adjoining each of these light panels is an indicating and recording ammeter which shows the total load on each automatic substation.

sender, consisting of automatic telephone-type relays located in the control cabinet at the substation, automatically sends impulses or code over the trunks to the office on the operation of power control or conversion apparatus in the distant substation. A corresponding chain of relays at the office receives this code, setting up a selection which operates a relay controlling the lamp circuits of certain red or white lights indicating the operation which has taken place at the substation.

As the code is received at the office and preceding the change in the lamps which indicate the functioning of equipment a buzzer sounds and a red or white pilot lamp, connected with the substation group of lamps, lights. The red pilot lamp indicates that the closing of a contactor or a starting operation is taking place, while the white lamp denotes the reverse. The object of these pilot lamps is to call the dispatcher's attention to the substation in which a change is to take place.

The supervisory mechanism is so arranged that after one code set up by the operation of power equipment is completely sent to the office it is ready to respond to the operation of any other power equipment which has operated in the meantime. In other words, if several pieces of substation equipment operate simultaneously, the corresponding codes are stored up in the substation cabinet and are sent to the office, one after the other, with the highest code number having preference.

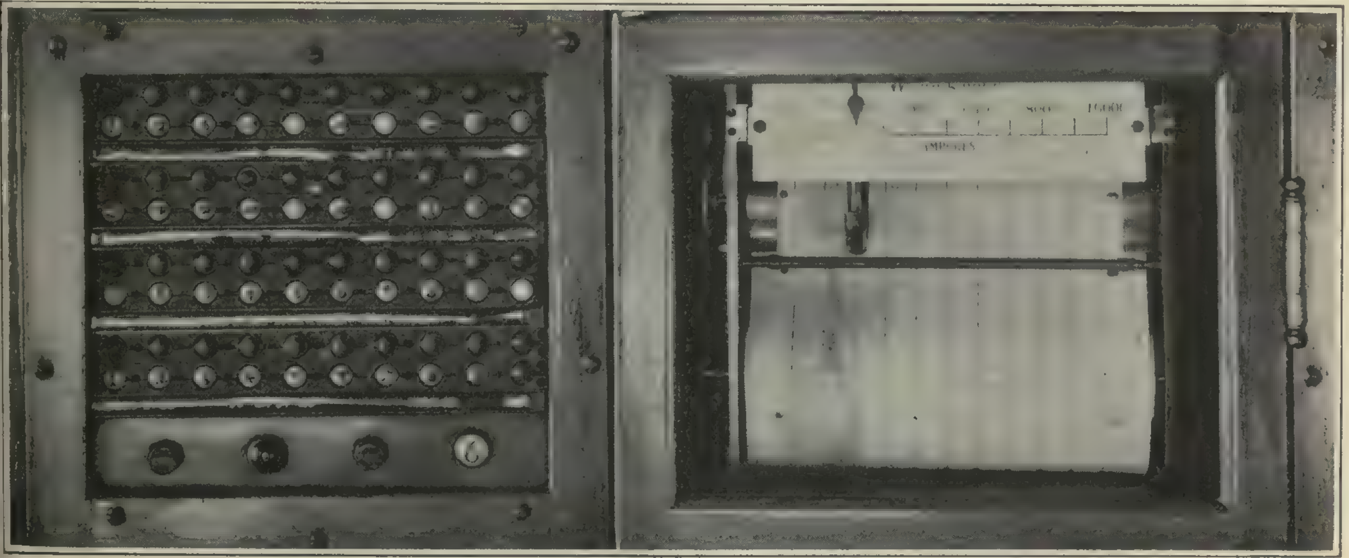


Simplified Single-Line Diagram Showing Connections between the Load Dispatcher's Desk in the Hanna Building of the Cleveland Railway and a Typical Substation Several Miles Away

The load dispatcher's office equipment is indicated at the top of the diagram and shows the load dispatcher's desk, as at present erected for fifteen substations. When more than fifteen automatic substations are in service a second unit, completing a semicircle, will be added. In the cabinet at the right are the banks of relays that automatically send the code to the corresponding cabinet in the substation. If two signals are by chance given simultaneously, the cabinet stores one of them while the other one goes through, when the second will automatically follow as soon as the circuit is clear. The cabinets at both the sending and receiving ends are either for sending or receiving codes. Only four wires connect any one substation with the load dispatcher's office, two being used for the operating code and two for the recording meter connection.

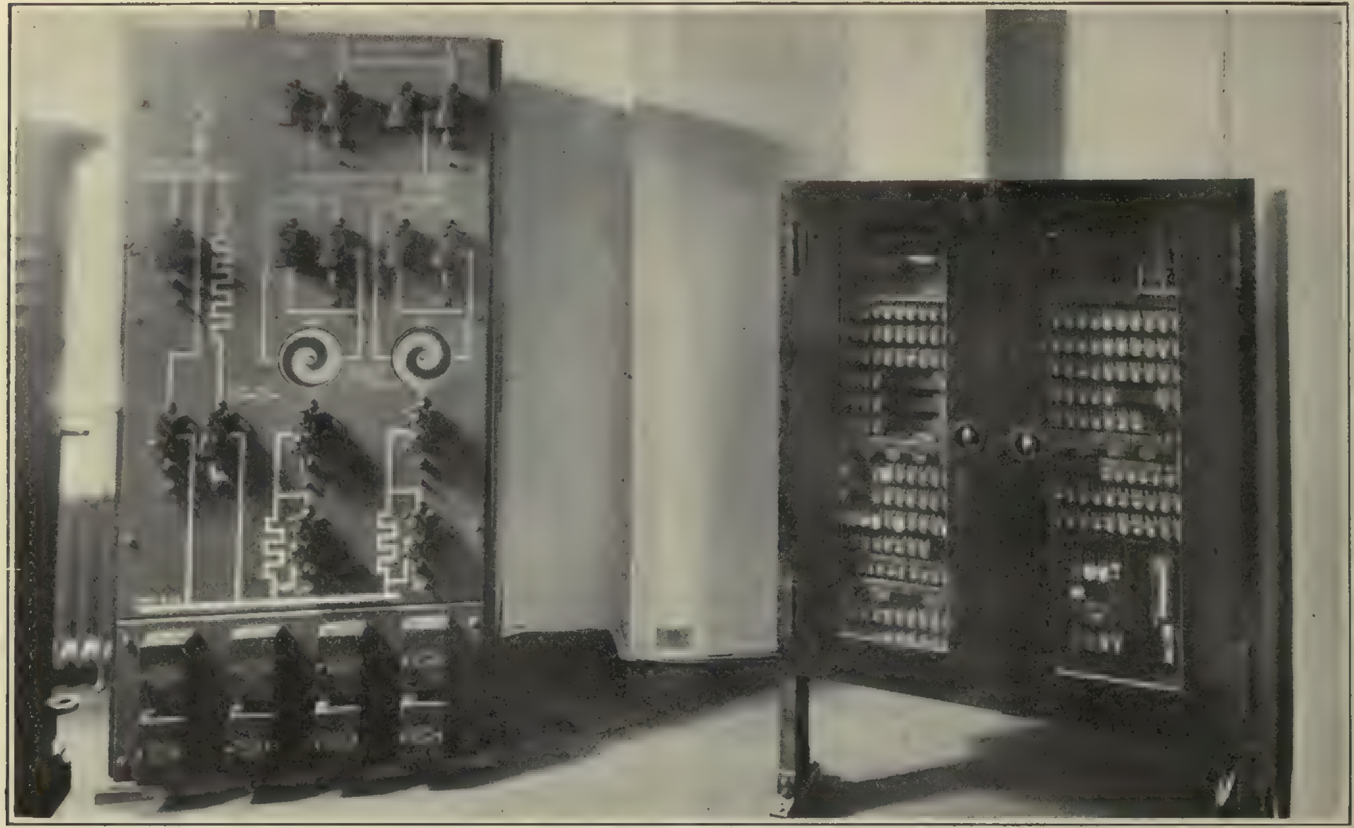
METHOD OF ACTUATING CONTROL FROM OFFICE

A set of 36 keys of adding machine type is located on the dispatcher's desk. Each of these keys is inscribed with the insignia denoting its function. It will be noted in the drawing that each automatic station is represented by a key in the first or second rows on the left side of the key plate; the next row is for converter operations; the fourth row for d.c. feeder operations, and the fifth, d.c. feeder numbers. If the dispatcher wishes an operation in a certain station to take place he depresses the key corresponding to the number of that station. By so doing one relay-type sender of the key set is connected to the trunks of the



Supervisory Lamp Bank and Remote Load Indicator for One Substation

This is the upper left hand section of the vertical control board, showing the appearance of the equipment whose connections are given in the line drawing. Space is provided for fifteen of these sections



A Model Automatic Substation and Its Remote and Supervisory Control Cabinet Are Set Up in the Dispatcher's Office for Demonstration Purposes

automatic station in which he desires to bring about a change. He next depresses the key or keys bearing the designation of the operation he wishes to perform. Then the key marked "prepare" is depressed, after which the relay sends impulses corresponding to the code set up by the depressed keys. The code is received at the substation by a chain of receiving relays and energizes the selection relays, which lock in a closed position. The selection automatically imposes potential on the auxiliary switch of the power apparatus which the dispatcher wishes to operate. A code is sent back to the office, changing individual lamps so as to indicate to the dispatcher whether the circuit which has been set up will, when energized, operate the particular piece of equipment as contemplated. If the check-back is satisfactory the dispatcher depresses the "operate" key, which momentarily changes the lamps to the former condition and then operates the equipment. The code is again sent to the office, changing the lamps so that they indicate the operated or final condition of the power apparatus.

If the check-back is not satisfactory the dispatcher depresses the "release" key which restores the supervisory relay equipment at office and substation to normal without operating any power equipment. This phase of the control is an exceedingly valuable adjunct as it enables the dispatcher to check the correctness of his operation and that of the equipment, thereby insuring freedom from false operations.

Telephone communication is had between the dispatching center and the automatic substations over the connecting trunks. No interference is experienced between the control and supervisory codes and telephone communication.

The equipment of each automatic substation includes a device known as a load indication sender. This consists of a watt-hour meter, the elements of which are energized from transformers in the converter circuits. A relay energized through the commutator of this meter imposes impulses on one pair of the trunks connected to the office. The frequency of these impulses varies with the speed of the meter; that is, with the load of the station.

The impulses received at the office are translated through a polarized relay in conjunction with a special meter, so as to cause the movement of a pen, producing an indication of current values on the continuous strip chart. The meter is also provided with a scale and pointer from which the dispatcher can read the load at all times.

A summation of the operations controlled in the distant substations from the dispatcher's desk are as follows:

Either or both converters can be started, stopped or locked out; outgoing d.c. feeders may be transferred from main bus to auxiliary bus, retransferred or locked out; i.e., disconnected from both buses; the contactor controlling the current-limiting resistance between the main and auxiliary buses may be opened or closed.

The dispatcher may observe from the lamps on the substation panels of his desk:

(1) The initial starting operation of converters.

(2) The closing of the first d.c. contactor which connects the converter to the load through the entire bank of current-limiting resistance, and the operation of the final converter contactor shunting out the last step of resistance.

(3) Indication of the positions of all the outgoing d.c. feeder contactors, whether connected to main or auxiliary bus or locked out.

(4) The position of the contactor controlling the current-limiting resistance between buses.

(5) Whether or not the alternating-current supply lines are energized.

(6) A voltage indication, in two steps, of the auxiliary bus, thus acquainting the dispatcher with the progress being made during the burning off of grounds.

(7) An indication (in the case of the seven new stations) as to the operation of the motor-generator set used in connection with the control battery.

(8) A similar indication of the operation of the main air compressor.

(9) The opening and closing of the substation entrance door is called to the dispatcher's attention.

This last feature, in conjunction with the telephone, enables the dispatcher to keep in close touch with the maintenance men as they move about the system from station to station.

The system of remote control and supervision, as installed, does not supersede the functioning of the automatically controlled substation, but is merely superimposed or added to the automatic equipment. In the event of open or short-circuited cable pairs or trunks the control equipment is automatically disconnected from the substation through a system of trunk guard relays. The station then reverts to full automatic operation without the supervision of the dispatcher.

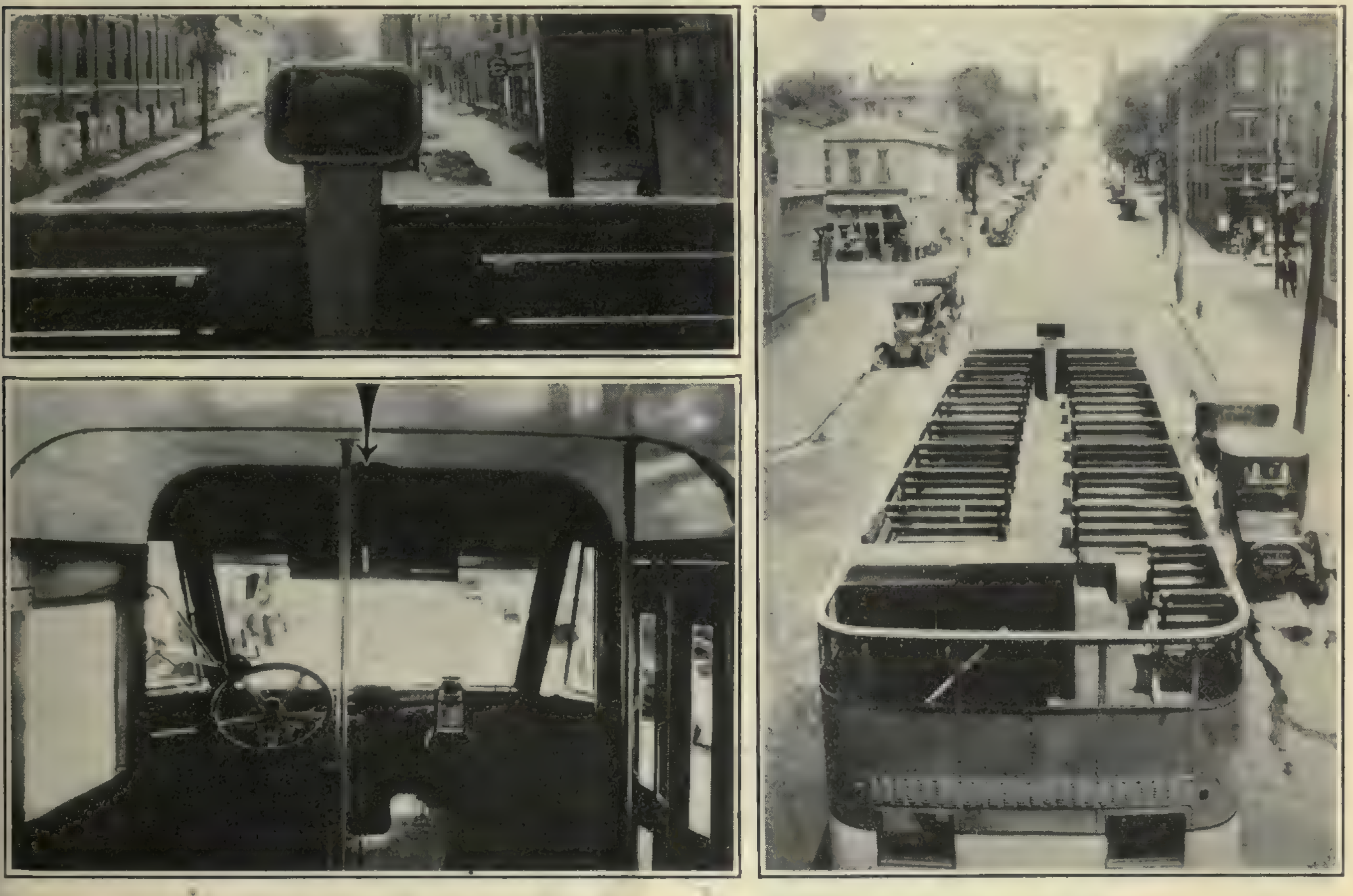
The "lock-out" feature mentioned in conjunction with the control and supervision of converters has been found desirable on this system. This is because the resistance between stations over the distribution system is low, which results in all converters on the system attempting to share a proportional part of the total system load at any given time. It can be realized that with this condition existing the converters in automatic substations would start automatically before they were required and likewise operate for too long a period, with the accompanying detrimental effect to the over-all substation efficiency. The dispatcher, to overcome this phase, holds off or locks out equipment which is not necessary for the available load.

The "lock-out" position in connection with the d.c. feeders is provided to enable disconnecting of the feeders from both main and auxiliary buses in the event of a condition existing, such as a conflagration, on thoroughfares over which the feeders may extend.

Periscopes and Loud Speakers for Double-Deck Buses

Desiring to Operate Double-Deck Buses Under One-Man Control the Kansas City Railways Developed Special Equipment to Facilitate This

ONE-MAN operation of double-deck buses by the Kansas City Railways, Kansas City, Mo., has been made possible through the development of special periscopes and loud speakers with which to observe and direct passengers on the upper decks. When the buses were built in 1925 the plans called for both of these items of equipment, but apparently no periscope suit-



This Special Equipment for Viewing the Upper Deck Was Developed by the Kansas City Railways

At top, left—The top of the periscope is inconspicuous and does not interfere with the view of the passengers sitting on the upper deck.

Bottom, left—Arrow indicates the location of the periscope mirror into which the operator looks. At the left may be seen the loud speaker transmitter in the "on" position.

At right—Top view of a bus showing the periscope on the front railing.

able for this type of service was available at that time. Those on the market were so designed that the view given to the operator was too small and required his entire attention in order to obtain even a distorted view of the upper deck.

It was desired to obtain a periscope which would make it possible for the operator to observe the upper deck without having to move his body or distract his attention from the road for more than a second. Under the supervision of R. W. Bailey, superintendent of power and equipment, a periscope was designed and perfected in the shops of the railway, and just recently the finished product has been installed on all of the eighteen double-deck buses operated.

What the Operator Sees When He Looks in the Periscope Mirror. The Picture Is Somewhat Blurred Because of Difficulties Encountered in Photographing a Triple-Reflected Image

No unusual features mark the loud speakers, which have been installed simultaneously with the periscopes. They are of the conventional radio amplifier type, with the horn located under the left front seat. From this point the operator's voice is plainly audible over the entire upper deck. The transmitter is located on a swinging arm attached to the left front corner post. This arm is held in two positions: "On," as is shown in an accompanying illustration, ready for the operator's use, and "Off," when swung out of the way next to the operator's door.

When in the "Off" position the switch controlling the loud speaker circuit is open in order to prevent needless consumption of energy. Moved over to the steering wheel in the "On" position the switch contact is made and the loud speaker is ready for use of the operator in calling the streets and making any other announcements necessary to passengers on the upper deck.

One energetic bus operator of the company recently saw in this new equipment an opportunity to render to his patrons a modicum of extra service not prescribed in the rule book. Fresh air fans crowded the upper deck of a Linwood-Benton bus as it rolled along Linwood Boulevard one hot night not long ago. Not a passenger sat below and a glance at the periscope convinced Vayne E. Lumpkin, the driver, that all was quiet and peaceful above him.

Suddenly, and apparently from out of the stillness of the night, came the announcement in a pleasant tenor voice, "Station BUS broadcasting."

Conversation halted. "Here," thought the passengers, "is something new in the way of bus service."

"When did they equip the buses with radios?" one asked of his neighbor.

Then came a few bars of a song familiar to all listeners-in—

> "I'm sitting on top of the world,
> Just rolling along, just rolling along."

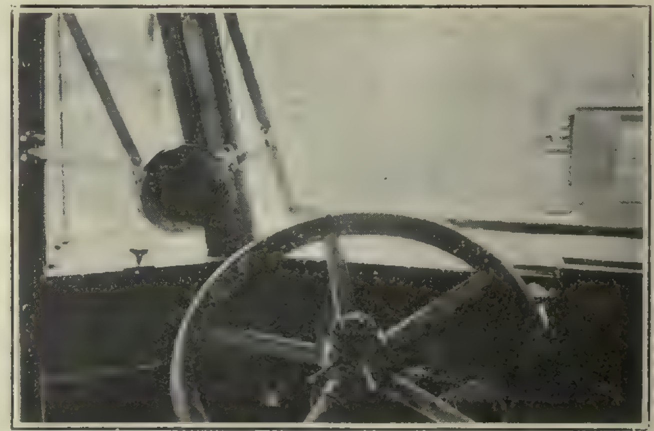
With this song and others were the passengers entertained. Soon most of them were convinced that there actually was a radio receiving set on the bus and that the periscope, staring vacantly at them from the front of the upper deck, was serving to carry the sound up to them.

Down on the driver's seat Vayne Lumpkin, with his eyes and mind on the road ahead, was singing softly into the mouthpiece of the announcing device, as much to himself as to his bewildered passengers.

The program continued, static-like sounds filling in between numbers and announcements being made in real radio fashion. One by one the passengers left the bus, few of them ever realizing that they had not been listening to a real radio program.

All of this was of course somewhat of a departure from usual procedure in bus operation and Mr. Lumpkin's example could scarcely be followed universally by bus operators with the same gratifying results. Of course a new school of training for embryonic singers might be established, making one's vocal attributes a factor in considering him for a driver's position.

The lower extremity of the periscope is practically unnoticeable from the viewpoint of the passengers on the lower deck, located as it is right at the ceiling line at the front of the bus. Yet its location is such that the operator in his seat need but glance upward at about a 45-deg. angle until his eyes focus on the lower mirror, the dimensions of which are 4 in. x 6 in.


Close-Up of the Loud Speaker Transmitter in the "On" Position, Ready for the Operator's Use

No more movement of the body is required to look into this plain flat mirror of the periscope than to glance into the rear vision mirror above the windshield. Neither does the height of the operator have to be taken into account in locating the periscope.

The periscope housing, or tube, extends up through the ceiling and front upper deck floor and is anchored to the upper arm rail, as shown in an accompanying illustration. It will be noted that the periscope is located in the center of the aisle (facing the rear), commands a clear view of the entire upper deck and yet does not obstruct the view of the passengers.

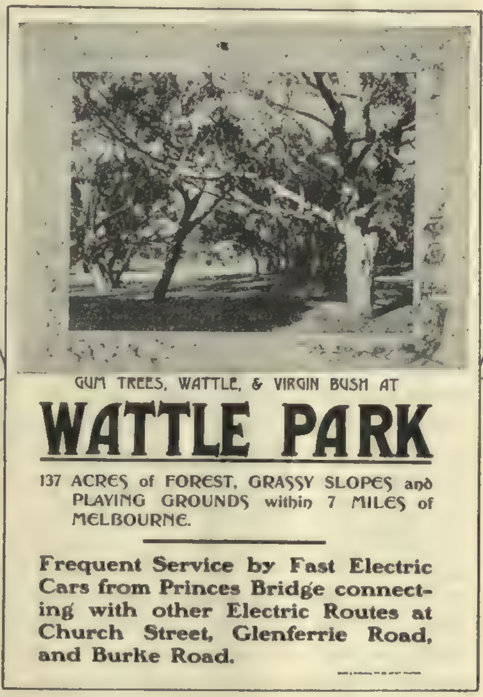
Selling Rides in Melbourne Through Car-Window Posters

REFERENCE was made editorially in the Aug. 14 issue of ELECTRIC RAILWAY JOURNAL to the use of radio broadcasting every Friday night by the Melbourne & Metropolitan Tramways Board, Melbourne, Australia, to secure publicity for week-end pleasure objectives via car or bus. Aside from this, the management has made excellent use of car-window dodgers which manage to combine an alluring picture with necessary text within areas from 8½ in. square to 12 in. x 18 in. The cost of an edition of 2,000 varies from £5 to £10, according to size and quality of the placard.

Like the New Yorker who has never climbed the Statue of Liberty or the San Franciscan who has never seen the Golden Gate at sunset, many a Melbourne resident needs to be reminded occasionally that he is living in and near scenes of great beauty. Such a reminder, for example, is furnished by the placard on Wattle Park. This park is a 137-acre reserve, the property of the Tramway Board, in which have been preserved many trees typical of the Australian "bush," such as the gum, blackwood, wattle and acacia. Its attractiveness has been enhanced by its establishment as a bird and game sanctuary. This park is within 7 miles of Melbourne and is reached for a trolley fare of 5½d. (11 cents) on weekdays and 6d. (12 cents) on Sundays. Two other recent dodgers show "A Quiet Corner at the Zoo" and the lake at Queen's Park.

The Australian's love for outdoor sports is catered to by one dodger showing a stirring football scene to accompany a schedule of six games on one day, while another advertises the "Melbourne Cup" in connection with "the sport of kings." Another dodger, announcing the opening of the electrified St. Kilda Road, gives a good idea of the side-door car now standard on the tramway lines in Melbourne.

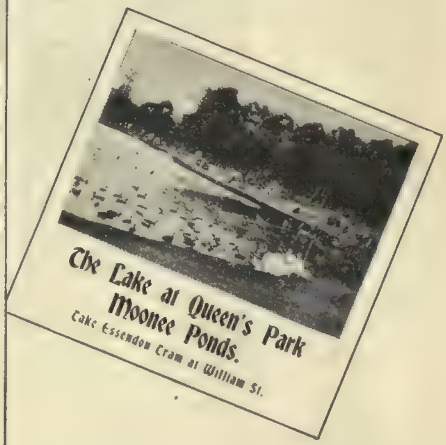
A Quiet Corner at the Zoo.
Take Trams in Elizabeth St. & William St.

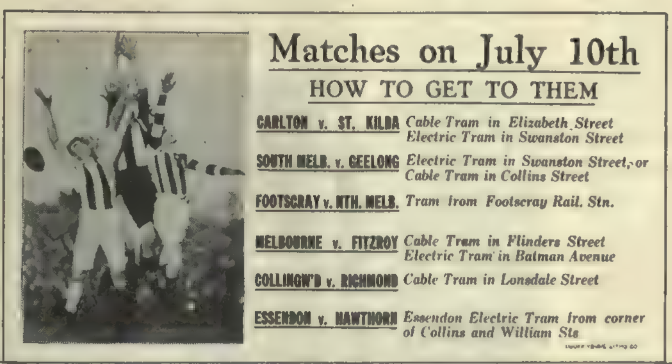

GUM TREES, WATTLE, & VIRGIN BUSH AT

WATTLE PARK

137 ACRES of FOREST, GRASSY SLOPES and PLAYING GROUNDS within 7 MILES of MELBOURNE.

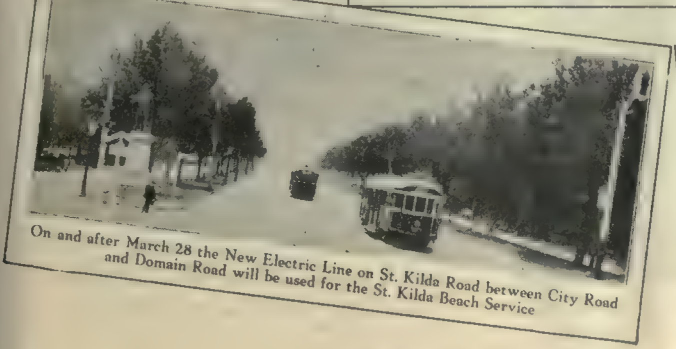
Frequent Service by Fast Electric Cars from Princes Bridge connecting with other Electric Routes at Church Street, Glenferrie Road, and Burke Road.

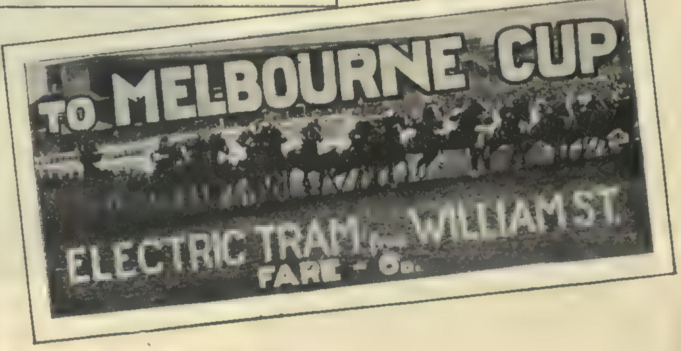

The Lake at Queen's Park Moonee Ponds.
Take Essendon Tram at William St.


Matches on July 10th

HOW TO GET TO THEM

CARLTON v. ST. KILDA	*Cable Tram in Elizabeth Street* *Electric Tram in Swanston Street*
SOUTH MELB. v. GEELONG	*Electric Tram in Swanston Street, or Cable Tram in Collins Street*
FOOTSCRAY v. NTH. MELB.	*Tram from Footscray Rail. Stn.*
MELBOURNE v. FITZROY	*Cable Tram in Flinders Street* *Electric Tram in Batman Avenue*
COLLINGW'D v. RICHMOND	*Cable Tram in Lonsdale Street*
ESSENDON v. HAWTHORN	*Essendon Electric Tram from corner of Collins and William Sts*


On and after March 28 the New Electric Line on St. Kilda Road between City Road and Domain Road will be used for the St. Kilda Beach Service

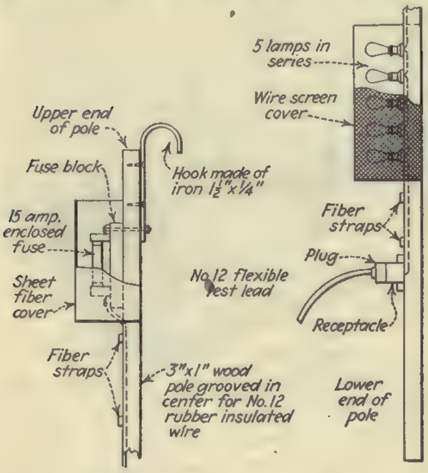

TO MELBOURNE CUP
ELECTRIC TRAM ... WILLIAM ST.
FARE - 6.

Posters Are Used Effectively in the Cars at Melbourne, Australia

Maintenance Notes

Handy Testing Pole

WHEN testing out railway motors for short circuits and grounds and also for testing the car wiring in case of trouble it is quite common practice for the electric railway repairmen to use line potential with either a resistance or bank of lamps in series with the test lead. In many cases this test circuit can be attached directly to the car lighting circuit, but sometimes it happens that the ground or short circuit necessitates keeping the trolley from the wire. In that case it is convenient to have a pole-testing outfit which can be hooked over the trolley wire or attached to some other terminal with line potential.



Car Equipment Test Pole

The upper end of the pole shown at the left has a metal hook for making contact with the trolley wire and a fuse with sheet fiber cover. The lower end of the pole shown at the right contains a bank of five lamps and a receptacle for plugging in the test lead.

The accompanying illustration shows the details of a pole-testing outfit which has been found of particular convenience on a large Eastern railway system. The pole itself is 12 ft. long and is made of 1½-in. by ¼-in. stock. A flat iron hook 1½ in. wide by ¼ in. thick is attached to one end and a bolt at the lower end of this hook passes through the pole and makes connection with one of the terminals of a 15-amp. fuse block. An inclosed fuse of 15-amp. capacity is used in the circuit. The fuse block and fuse are covered with sheet fiber, the cover being open at both top and bottom. From the lower terminal of the fuse block a lead of No. 12 rubber-covered wire runs down the pole, which is grooved so that the wire is imbedded in the pole. Fiber straps 1 in. wide hold the wire in position. These are spaced 15 in. apart.

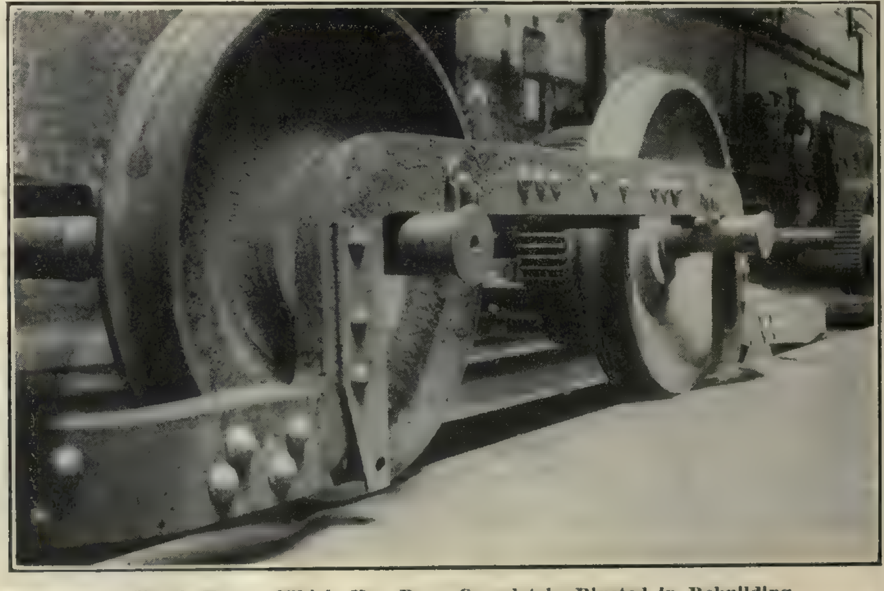
The lower end of the pole has rounded corners for convenience in handling and a bank of five lamps is installed along the pole, and just below this a standard receptacle so that the test lead can be plugged in. A wire screen hinged cover is installed over the lamps. This protects the lamps from injury and the hinged construction allows removal and replacement of lamps quickly. The plug and receptacle with a separate test lead has been found particularly convenient, since if the lead is attached permanently to the pole it is usually left loose and so is dragged along the floor, or if looped up it becomes injured quickly. This construction also makes it much easier for storage of test poles, since they can be placed in a rack without any loose dangling wires.

A test of car equipment frequently requires a current greater than will pass through five lamps in series. In such cases metal washers are placed in some of the lamp receptacles so as to short circuit them, and where equipment is being tested on the line side frequently all of the lamps are short circuited. This is the reason for using a fuse of such large capacity, as a smaller fuse would be sufficient if the lamps were always in the test circuit.

Rebuilding Trucks with Rivets Rather than Bolts

WITH the present-day development of cutting torches it is far more economical to cut off the heads of bolts rather than laboriously to unscrew nuts which have become rusted tight. Therefore, when the Berkshire Street Railway, Pittsfield, Mass., wishes to rebuild the trucks of its cars it has adopted the policy of cutting the old bolts out with torches and replacing them with rivets, which later may be removed in similar fashion. The rivets cannot become loosened and thus are not subjected to the battering which a loosened bolt must suffer from weaving structural parts.

The accompanying illustration shows a typical job of riveting which has been done on one of the company's trucks. It was stated that the time required for removing the old bolts by the cutting process is practically negligible, it being possible to remove a group of five bolts or rivets in from three to five min-



A Truck Frame Which Has Been Completely Riveted in Rebuilding

(Note—The wheels and axles shown are being used simply to support the truck frame.)

utes. Incidentally it is much easier to rivet structural parts which are difficult of access than to insert bolts and tighten nuts to the necessary degree.

Rubber-Covered Steps Prevent Accidents

RUBBER covering for steps is in quite common use in the industrial field, but for street cars it is somewhat of a novelty. It is being tried on one of the cars of the Levis Tramways by H. E. Weyman, general manager, as a means to prevent step accidents due to slipping. Corrugated rubber of the type used for floor mats has been attached to the folding steps of the car. It is inconspicuous and does not interfere with the action of the mechanism. It does, however, provide a much surer footing, particularly in wet weather. While it has not seen service in the winter, it is felt that snow and ice will not cling to the rubber so tightly as they do to wood, and that there will be considerable cleaning action when the steps are opened and closed.

Rubber Covering Is Being Tried on the Steps of This Levis Tramways Car to Prevent Slipping

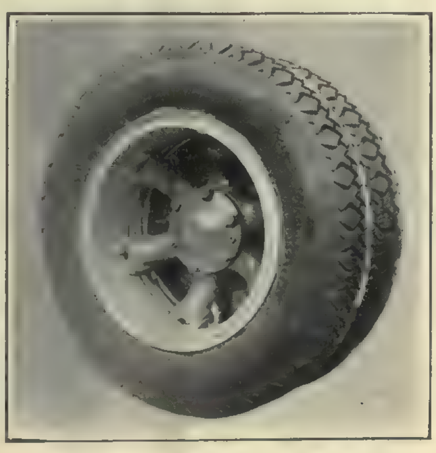
Preventing Leaks Around Car Sash

ONE of the questions discussed at the semi-annual meeting of the Electric Railway Association of Equipment Men, Southern Properties, was practical methods which have been used to prevent leaks around the sash of high-speed cars. The discussion showed that several companies have used channel rubber, others commercial putty or felt. One company is using a stationary vestibule sash. It was the consensus of opinion that felt or rubber used had not proved entirely satisfactory and that railways which had tried it were again using putty. The Texas Electric Railway, Dallas, Tex., has overcome leakage by putting a flanged piece of metal onto the sash and arranging it so that it comes up high enough to clear the sash, leaving a projection of ½ in. to ⅝ in., and by cutting off the beads usually found on the sash, a piece of metal being substituted for this. The steel used is No. 24 gage.

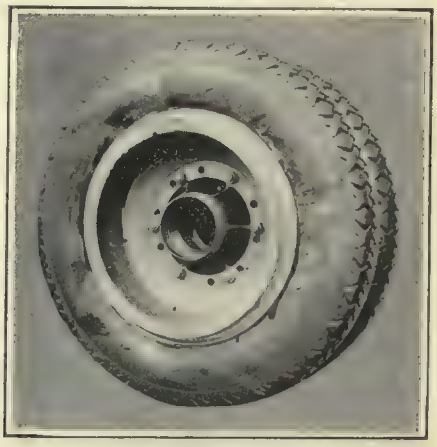
New Equipment Available

Cool Tires Feature New Wheel Design

AMONG the causes contributing to tire trouble and expense are unsprung weight and heating of the tires from the action of the brakes. To offset these difficulties, the Steel Wheels, Incorporated, of Newark, N. J., has just placed upon the market a new type of light-weight self-cooled automotive wheel suitable for buses and pneumatic-tired trucks. These wheels have been designed by Charles G. Keller, an experienced automotive engineer, and they embody patented features which render them unique in several respects. There is a system of ventilation or circulation of air, and as tests have shown the temperature of tires on the wheels so ventilated is considerably lower than on any standard type of wheel which had been formerly employed.


Outside View of Rear Dual Wheel

The Vulcan steel wheel, as this new wheel is known, consists of a cast-steel spider, integral with the hub and possessing a U-shaped hollow spoke with beveled spoke ends. It has no felloe, but is arranged so that the rims on which the tires are mounted are directly applied and locked upon the spoke ends. Any of several standard rims may be employed as well as a special rim manufactured by this company. The special rim contains the locking bolts that are integral with the rim and that are expanded or contracted in order to secure the rim or to loosen it from the spoke ends. When the fastening lugs are loose the rim with tire is turned until the fastening lugs are disengaged from the spoke ends. This allows the rim with tire to be removed easily in a bayonet lock action. The unsprung weight of this wheel is from 25 to 30 per cent less than that of a corresponding disk wheel of the same size, while the manufacturers say the price will not be appreciably more.


Inside View of Wheel Showing Intake for Cooling Air

When standard rims, such as Firestone or Goodyear types, are used, the locking screw is applied to the end of the spoke instead of the rim. The expansion of the locking screw against the bevel surfaces of the spoke ends, however, holds the rim in place against stops which are integral with the spoke ends.

This method of securing and loosening the rim has no loose parts. The locking bolts are a permanent part of the wheel construction. Another feature of this locking device, when applied to dual tires, is that either the inside or the outside tire may be independently loosened or tightened with the wrench.

The spoke and the hub form a cast-steel spider provided with ribs which cause air to circulate through the hollow spokes from the hub to the rim. The circulating air then passes out over the outer circumference of the brake drum. A continuous flow is thus provided which has a cooling effect and prevents the tire from exceeding a temperature which might prove injurious to the fabric or rubber.

A recent scientific test has been made with a standard bus, on a long mountain road, in Pennsylvania. Vulcan wheels were applied to a bus weighing approximately 17,000 lb. and operated down a 2½-mile grade averaging about 10 per cent with air brakes applied. The tire temperature was then taken and compared with the temperature of tires run, under exactly the same conditions, upon standard makes of wheels. The temperature of tires upon the Vulcan wheels proved appreciably lower in each instance.

Rear Dual Wheel Showing Hub Spider with Brake Drum but Without Rims

In addition to the test on the hill, a traffic test was made which consisted in subjecting the bus to 100 stops per hour for four hours continuously. At the end of each hour the temperatures of the tires and various parts of the wheel were read. In this case the Vulcan wheels showed appreciably less heat transmitted to the tires than in the case of standard wheels.

Large Capacity Oil Circuit Breakers

DESIGNED for either indoor or outdoor service, the General Electric Company announces a line of oil circuit breakers available in sizes of 400, 600, 800 and 1,200 amp. and voltages of from 15,000 to 88,000 inclusive. They bear the General Electric designations FK-236 and FHK-236.

The breakers rated at 73 kv. or less may be used up to altitudes of 10,000 ft. The 88-kv. breakers are equipped with "high altitude" bushings when used above 4,000 ft. The range of interrupting capacities for the FK-236 breakers is from 2,000 to 7,000 amp., and from 3,300 to 14,000 amp. for the FHK-236 type of breakers.

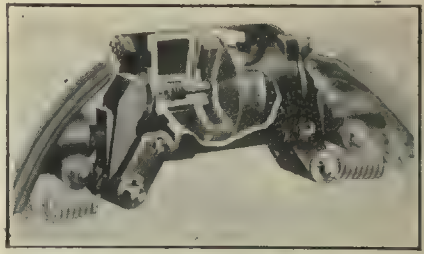
Each triple-pole breaker is made up of three single-pole, single-throw units operated by a single mechanism. This mechanism may be manually operated or electrically operated by either a solenoid or a motor.

Unit mechanisms are totally inclosed within the breaker frame and are, therefore, freed of any tendency to reclose under the action of unbalanced internal pressures which may be set up when opening under abnormal conditions. A larger air space is thus also provided, with consequent increase of interrupting capacity.

Of the two forms, the type FK-236 uses finger and blade contacts, while the type FHK-236 is equipped with plunger or rod type contacts and explosion chambers. With explosion chambers higher interrupting capacities are obtained, although both types are adequate for the service for which they are rated.

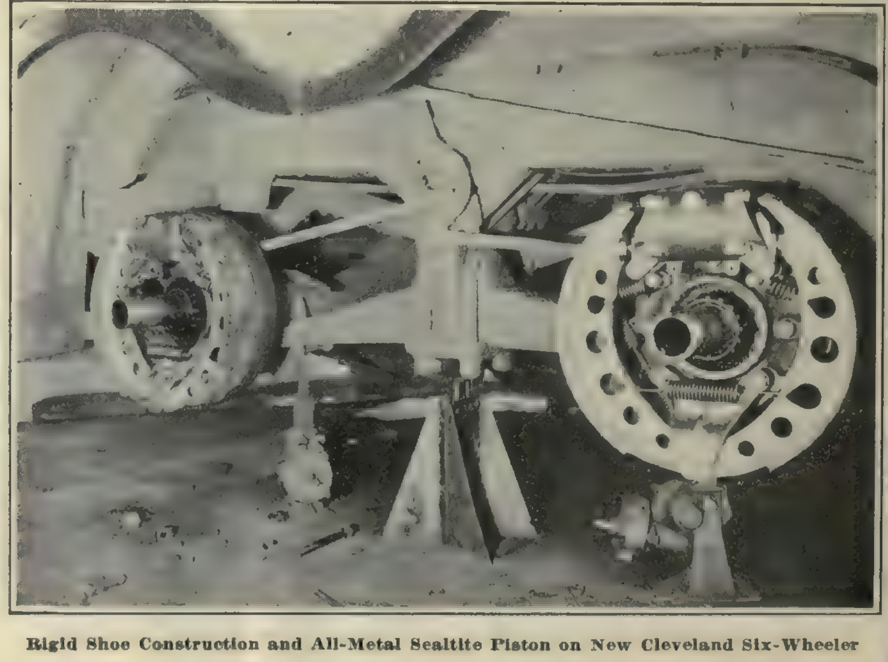
Brake Cylinder Leaks Overcome

COMPARATIVELY short life of piston packing as compared with other parts of the air brake system for buses led the Christensen Air 14,000 amp. for the FHK-236 type. devote particular attention to the perfecting of a wearproof and leakproof piston. The result has been the adoption of the Sealtite design. This piston is all metal and gives a perfect seal. It is practically wearproof and is unaffected by oil vapor which comes over from the compressor in the air line.



Brake Cylinder Cut Away, Showing Sealtite All-Metal Piston Installed

The Sealtite piston consists essentially of a thin, flexible alloy cup. Inside the cup is an expander ring having on its inner circumference a ball seat. The face of the piston is a valve plate which seats on the expander ring. It is held in position by a coil spring and nut. The coil spring exerts a sufficient pressure to keep the face plate firmly seated and the metal cup expanded against the cylinder wall. When air is admitted to the cylinder the pressure exerted on the face plate of the piston causes it to seat more firmly against the cylinder wall. Thus, the seal is tightened as the air pressure increases. To give rigidity to the complete piston assembly, a strong steel follower plate is fastened behind the cup.



Rigid Shoe Construction and All-Metal Sealtite Piston on New Cleveland Six-Wheeler

Association News & Discussions

C.E.R.A. Master Mechanics Discuss Ways of Modernizing Equipment

REVIEW of the work accomplished toward improved car construction, efficient shop methods and high-class maintenance was the principal business of the experience meeting of the Central Electric Railway Master Mechanics Association, held at Sandusky, Ohio, Sept. 9. Thirty-five master mechanics and their guests attended the meeting.

In opening the discussion, Pierre V. C. See, president of the association, described briefly some of the work which the Northern Ohio Power & Light Company has been doing in Akron, Ohio. A new bus has been designed and built in the railway shops, the body being built by the G. C. Kuhlman Car Company, Cleveland, Ohio. The bus seats 29 passengers, has a 234-in. wheelbase, an over-all length of chassis of 320 in. and a frame height at the driver's position of 27 in. The bus, bearing the nameplate "Northern Ohio," will be exhibited at the October convention of the American Electric Railway Association. Its axle has the extremely high road clearance of 9 in. and is geared 6 to 1 so as to give extra power for hill climbing without undue engine speed. There are many severe hills around Akron. The railway has experienced considerable trouble from broken frames in the fleet of buses which it now operates, and in the new design considerable care has been devoted to this portion of the chassis. A 9¾-in. pressed channel frame was selected, which is tied together with members partly tubular and partly channel. Exceptionally large gussets were installed so as to prevent the possibility of any loosening at the joints.

The front springs have a novel method of mounting. Instead of the spring being dead-ended at the front of the chassis, it is anchored at the rear with the flexible shackle connecting with the shock absorber in the front.

In addition to building this new bus, the Northern Ohio Power & Light Company has remodeled 41 steel cars of old design for one-man operation. One car used in city service, which originally had end doors and platforms, has had a center door added and 3 ft. has been cut off the back end. This is a single-end car. Particular attention has been given to the method of painting to make this car attractive and also to seat upholstering, so as to provide an easy ride for passengers. In addition the company has also remodeled one interurban car. Among other improvements in maintenance methods which have proved of particular value Mr. See mentioned the silk screen and squeegee method of painting roller destination signs and the oil reclaiming methods used by the company.

Several improvements in supporting and connecting foundation brake rigging on the cars of the Lake Shore Electric Railway were described by A. Brownworts of that company. Heat-treated bushings are used at all connections and fulcrums of brake levers and improved methods of connecting have reduced maintenance troubles. A J. Challeen, superintendent of equipment and shops, Detroit United Railway, described the lubrication schedule which he is using for the oiling and packing of bearings. An inspection card index system is used with this work.

Master Mechanics of the Central Electric Railway Association on the Court House Steps in Sandusky, Ohio

J. B. Corderman, master mechanic Lima-Toledo Railroad, told of rebuilding some cars and the improvements made. Methods of applying oil and preparing waste for packing have also been improved, so that the lubrication cost is but 20 cents per thousand car-miles, including all waste, car oil, compressor oil and gear grease. The method used for saturating waste is to cook it in hot oil. Mr. Corderman also referred to wear caused by the end thrust of helical gearing. In order to take up this wear he uses the Westinghouse method of inserting $\frac{1}{16}$-in. shims between the armature and thrust collars.

Use of solid bronze bearings has produced gratifying results for the Cleveland-Southwestern Railway & Light Company. The methods used were described by J. W. Osborn, superintendent of rolling stock. All bearings are fitted to the axles or shafts on which they are used. Axle bearings are marked with their position in the car, so that in overhauling they are returned to the original location. A clearance of 0.012 in. over the shaft diameter is used for armature bearings after they are pressed in to housings. Mr. Osborn also referred to economies in painting. His company uses the enamel system and applies one coat of clear enamel over the colored enamel, instead of using a clear varnish. This lasts longer and produces a pleasing appearance.

In addition to purchasing eight new cars, several others have been remodeled in the shops of the Steubenville, East Liverpool & Beaver Valley Traction Company. This work was described by R. E. Twiggs. In the remodeling, vestibule partitions were removed, the trucks were remodeled and top brake-hanger castings were standardized. Brake levers have also been standardized on city cars. The motors used under these remodeled cars have been completely revamped, and as a result of decreased maintenance, four less men are used on inspection and other work has been cut down nearly one-half. Improvements in lighting have been incorporated through the use of twenty low-voltage lamps in series. Trials have also been made of internally frosted bulbs.

George R. Green, superintendent of equipment Southern Michigan Railway, South Bend, Ind., described the vehicle collision light which his company has installed on the corners of cars in addition to headlights. This has an amber colored lens and its use has reduced accidents considerably. These corner lights are being added to cars as fast as they go to the shops for overhauling. His company has also remodeled some cars into a parlor car type. These are particularly attractive to car riders, and the receipts have increased considerably. Mr. Green also spoke of the value of the work being done by the Central Electric Railway Master Mechanics Association and the benefit derived from such meetings as the present one.

Through the purchase of new cars the Union Traction Company of Indiana has been able to retire some of its old cars. The best of the old motors have been overhauled and are used under freight cars in place of some still older equipment. This work was described by Thomas H. Nicholl, superintendent of motive power.

A. A. Crawford, superintendent of motive power Youngstown & Ohio River Railroad, said that he had now had one year's experience with the thirty-in-series type of lamp. He had found it particularly easy to change over from the five-circuit arrangement in cars to the single-circuit arrangement, and during the year had lost but twelve lamps due to failure, while there had been no loss by theft whatever. At the time these new type lamps were installed a bulletin was issued to the motormen and conductors which stated that these lamps could not be used for house lighting. Mr. Crawford also told of a method used to increase the speed of his cars. Funds were not available for changing the gear ratio, and so $\frac{1}{16}$ in. was taken off of the pole faces of the motors. This increased air gap increased the speed approximately 10 per cent. No commutator or brush trouble has been experienced.

SIX-MOTOR FREIGHT CAR DEVELOPED

The new six-motor freight car of the Western Ohio Railway was described by E. B. Gunn, superintendent of transportation and equipment for that railway. This has three motors per truck, and the car is now used in a six-car train hauling five trailers, where previously but three trailers were hauled. The energy consumption is but slightly greater than the four-motor equipment, even when hauling the increased load. Tests showed an energy consumption of 5.3 kw.-hr. per car-mile as compared with 4.9 for the four-motor equipment. Mr. Gunn also brought up the subject of breakage of triple valve stems and slide valves. This is to be investigated by experts from the Westinghouse Traction Brake Company and a report will be made at the next meeting.

H. G. Arthur, G. C. Kuhlman Car Company, described what has been accomplished through the standard design of freight car as adopted by the Central Electric Railway Master Mechanics Association. His company has now built 70 and has fifteen more on order. The American Car & Foundry Company has also built quite a number of cars of this type.

Improved results from acetylene welding were described by W. J. Fox of the Interstate Public Service Company. This work has included the welding of body castings, the building up of the faces of coupler knuckles and repairs to axle housings. Body castings with cracks about one-half way through have been repaired at an average cost of $11.48 for labor and material. This cost includes 15 per cent added for overhead. Building up of the faces of knuckles averages $6.01, and welding of axle housings is done for $17.83. A considerable saving has been accomplished through the standardization of steps on various types of cars, so that there are no rights and lefts.

COMING MEETINGS OF
Electric Railway and Allied Associations

***Oct. 1*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p. m.**

***Oct. 4-8*—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.**

***Oct. 10-15*—Congress International Tramway, Local Railway and Motorbus Association, Barcelona, Spain.**

***Oct. 25-29*—Annual Congress and Exhibit, National Safety Council, Book-Cadillac Hotel, Detroit, Mich.**

***Nov. 16-18*—Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.**

***November 16-19*—American Welding Society, fall meeting and International Welding and Cutting Exposition, Buffalo, New York.**

Terence Scullen, master mechanic the Cleveland Railway, told of the aluminum car which his company is building. A weight reduction to about half that of an ordinary car of similar size has been accomplished. The car, however, is only in the construction stage now. Mr. Scullen also suggested that it would be desirable for an association to take up the distribution of labor and material in the various classification of accounts. He said his company is now operating 50 trucks, whose maintenance was charged to equipment. Also, such track equipment as welders, grinders, etc., are charged to maintenance. This, of course, makes comparison of maintenance costs with other railways out of the question.

STANDARDIZATION TO MEET I.C.C. RULES

At the afternoon session Thomas H. Nicholl reported for the standardization committee. He took up the Interstate Commerce Commission's rules for the testing and inspection of locomotives other than steam. The committee has drafted a new set of rules embodying features of the I.C.C. rules which are suitable, and adding its own rules to this. This was gone over and discussed in considerable detail by the members present, and it was decided that this should be submitted to the executive committee of the Central Electric Railway Association for use in connection with any recommendations to be made. Reports were made by the committees on subjects, uniform charges and arbitration.

The next meeting of the association will be held in Toledo next February. After the meeting adjourned an inspection tour was made to the shop of the Lake Shore Electric Railway in Sandusky.

Electric Railways at National Safety Congress

MORE than 200 speakers will address the fifteenth annual congress of the National Safety Council, which will be held in Detroit Oct. 25-29. There will be 100 separate meetings covering a wide range of industries.

Arrangements for the sessions of the Electric Railway Section are being rapidly completed. Among the speakers scheduled are:

James P. Barnes, president Louisville Railway, "Accident Prevention—Why and How, from the Standpoint of the Executive."

R. W. Emerson, general manager Cleveland Railway, leader of round-table discussion on "No-Report Claims and What Is Being Done to Reduce Them and the Standing of the Safety Department in the Organization."

M. J. Feron, general superintendent of transportation Chicago Rapid Transit Company, appearing as chairman of "Board of Inquiry."

T. G. Hamilton, general superintendent Gary Street Railway, "Harmonious Relations Between Employees and Management and Their Effect on Accident Prevention."

R. H. Horton, president Philadelphia Rural Transit Company, "Bus Operation."

G. B. Powell, superintendent of transportation Louisville Railway, "Accident Classifications and Statistics."

American Association News

Red Special—Blue Special

DE LUXE trains to the 45th annual convention of the A.E.R.A. have been arranged for by the transportation committee. Both trains will leave from New York on the evening of Saturday, Oct. 2, arriving in Cleveland Sunday morning.

The Red Special via the Pennsylvania Railroad, for delegates from New York, Newark, Trenton, Philadelphia, Baltimore, Washington, York, Harrisburg and connecting points, will leave the Pennsylvania Station, New York City, Oct. 2 at 6:50 p.m., Eastern standard time. It is due to arrive in Cleveland at 8:50 Sunday morning.

The Blue Special, via the New York Central Railroad, for delegates from New York, New England, Albany, Utica and Syracuse, will leave Grand Central Terminal, New York City, Oct. 2 at 6.30 p.m. Eastern standard time. It is due to arrive in Cleveland at 8:30 Sunday morning.

Applications for reservations on these trains should be made with the following members of the committee:

New York, Newark and vicinity, C. H. Beck, Room 2300, 150 Broadway, New York City.

Trenton and Philadelphia, Thomas Cooper, Westinghouse Electric & Manufacturing Company, Philadelphia, Pa.

Baltimore and Washington, J. H. Hanna, president the Capitol Traction Company, Washington, D. C.

York and Harrisburg, C. F. Crane, Harrisburg Railways, Harrisburg, Pa.

Boston, Providence and down Maine, Edward Dana, general manager Boston Elevated Railway, Boston, Mass.

Springfield, Worcester, Pittsfield, Chatham and New Haven, C. V. Wood, president Springfield Street Railway, Springfield, Mass.

Albany, Utica and Syracuse, E. H. Murphy, general manager United Traction Company, Albany, N. Y.

Reservations for those who cannot leave until Sunday may be made on similar trains on each railroad leaving on the same schedule. All requests for reservations should be accompanied by remittances to cover cost of accommodations desired.

Added Entertainment at Cleveland

SPECIAL late supper will be provided in the Rainbow Room of the Hotel Winton during the Cleveland convention week, following the regular convention entertainment program. Arrangements for this have been made by the entertainment committee. A cover charge will be made by the management and service will be à la carte.

Wednesday, Oct. 6, will be special A.E.R.A. night and admission will be limited to wearers of the official badge. The program on that night will start at 11 p.m., for which the regular cover charge will be made. As a heavy attendance is expected for the feature program, the entertainment committee suggests that those wishing to be sure of having tables make reservations in advance with W. S. Koones, manager Hotel Winton, Cleveland.

Progress on Convention Building

SINCE the new building which was put up as an annex to the public auditorium in Cleveland was turned over to the convention committee on Sept. 4, the work of preparation has continued with unabated speed. After the finishing touches were put on by the Cleveland Railway forces it was necessary to clean up the débris which had accumulated during construction and to prepare the interior for receiving the exhibit. This has been done and the wiring, piping, etc., within the building have been installed.

The space between the two buildings which formerly was used for automobile parking has been cleared and tracks for outdoor exhibits have been laid. Between the new building and the auditorium there will be a walkway 50 ft. wide covered by a canopy. In this space will be placed working exhibits of track appliances such as grinders, tampers, etc.

Figures are not available for comparison of the total space which this exhibit will occupy with exhibits of other associations, since the track space is figured on a linear basis rather than a square foot basis. Were the entire exhibit figured on a square foot basis it would undoubtedly prove the largest exhibition of the kind ever held in this country.

Special Tax Committee Expanded

SOME time ago it was decided to appoint advisory members to the committee on special taxes of the American Electric Railway Association. One outstanding authority has been selected from each state to act in this capacity. Acceptances have been received from all but thirteen states. Those remaining have very limited electric railway operations. The first duty of these advisers was to furnish the association with a digest of the tax laws of each state that relate to electric railways. The association will analyze these digests and prepare a report to be read before the meeting of the special tax committee at the Cleveland convention on Oct. 7.

At this meeting it is expected that a program will be decided upon to promote this work during the year. While the work will be included in the activities of the special tax committee much of the detail will be handled by the association direct. Lucius S. Storrs, acting in co-operation with Alfred T. Davidson, chairman of the committee on special taxes, issued the invitations and will be sponsor for the work done by the advisory members. The details will be handled by Leslie Vickers, economist of the A.E.R.A.

The list of appointees who have accepted follows:

California—W. V. Hill, manager California Electric Railway Association, San Francisco.

Colorado—Ernest Stenger, president the Denver Tramway Corporation, Denver.

Connecticut—W. J. Flickinger, vice-president the Connecticut Company, New Haven.

Delaware—T. W. Wilson, vice-president and general manager Wilmington & Philadelphia Traction Company, Wilmington.

Florida—J. P. Ingle, manager Jacksonville Traction Company, Jacksonville.

Georgia — P. S. Arkwright, president Georgia Railway & Power Company, Atlanta.

Illinois—D. W. Synder, Jr., vice-president Illinois Traction System, Springfield.

Indiana—A. W. Brady, receiver Union Traction Company of Indiana, Anderson.

Kentucky—J. P. Pope, vice-president and general manager Kentucky Traction & Terminal Company, Lexington.

Louisiana—H. B. Hearn, president Shreveport Railways, Shreveport.

Maine—Alfred Sweeney, general manager Androscoggin & Kennebec Railway, Lewiston.

Maryland — C. D. Emmons, president United Railways & Electric Company, Baltimore.

Massachusetts—L. D. Pellissier, president Holyoke Street Railway, Holyoke.

Michigan—Alfred Fischer, director Michigan Committee on Public Utility Information, Ann Arbor.

Minnesota—A. M. Robertson, president the Duluth Street Railway, Minneapolis.

Mississippi—C. P. Couch, vice-president Mississippi Power & Light Company, Jackson.

Missouri—A. T. Perkins, manager for receiver United Railways of St. Louis, St. Louis.

Nebraska—R. A. Leussler, vice-president Omaha & Council Bluffs Street Railway, Omaha.

New Hampshire—J. Brodie Smith, general manager Manchester Street Railway, Manchester.

New Jersey—E. W. Wakelee, vice-president Public Service Railway, Newark.

New York — E. M. Walker, president Schenectady Railway, Schenectady.

North Carolina—W. L. Currie, claims attorney Carolina Power & Light Company, Raleigh.

Ohio—W. A. Draper, president Cincinnati Street Railway, Cincinnati.

Oregon — W. H. Lines, vice-president Portland Electric Power Company, Portland.

Pensylvania—A W. Robertson, president Philadelphia Company, Pittsburgh.

Rhode Island — E. J. Dickson, vice-president United Electric Railways, Providence.

South Carolina — Stuart Cooper, vice-president and manager Charleston Consolidated Railway & Lighting Company, Charleston.

Tennessee — T. H. Tutwiler, president Memphis Power & Light Company, Memphis.

Texas — Richard Meriwether, vice-president and general manager Dallas Railway, Dallas.

Utah—E. A. West, general manager Utah Light & Traction Company, Salt Lake City.

Virginia—T. Justin Moore, general counsel Virginia Electric & Power Company, Richmond.

Washington—Hance H. Cleland, attorney, Cleland & Clifford, Olympia.

West Virginia—J. D. Whittemore, vice-president Monongahela-West Penn Public Service Company, Fairmont.

Wisconsin—H. L. Geisse, general manager Wisconsin Valley Electric Company, Wausau.

District of Columbia—William F. Ham, president Washington Railway & Electric Company, Washington.

Metropolitan Section Meets Oct. 1

OPENING the 1926-27 season, the Metropolitan Section of the A.E.R.A. will meet Oct. 1 at the Engineering Societies Building, 33 West 39th Street, New York City, beginning at 8 p.m. The subjects committee has prepared a full program. There will be an address by President F. R. Coates on "Recent Developments in the Electric Railway Industry." W. R. Webster, vice-president Bridgeport Brass Company, will give an illustrated talk on the "Copper and Brass Industry and Its Relation to Transportation." Entertainment will be provided through the courtesy of Eddie Wager and his troupe.

There will be a Dutch treat dinner at Friedlander's restaurant, 56 West 39th Street, beginning at 6 o'clock the evening of the meeting.

Engineering Standards

VARIOUS recommendations of the committees of the Engineering Association were passed on by the committee on standards at a meeting held at association headquarters, New York City, on Sept. 14. In general these recommendations were concurred in subject to final approval on the floor of the convention. In a few instances action was deferred awaiting further explanation from the committees presenting the proposed standards.

Members present were Charles Rufus Harte, chairman; H. A. Johnson, C. G. Keen, John Lindall, N. W. Storer, F. W. Peters representing H. L. Andrews, J. A. Brooks, J. M. Waldron, C. C. Beck, J. J. Sinclair and M. B. Rosevear.

The News of the Industry

Ten-Cent Fare Asked in Buffalo

President of International Railway Says Service Cannot Continue to Be Rendered at Less than Cost

The International Railway, Buffalo, has applied to the New York Public Service Commission for permission to increase its fare in Buffalo from 7½ to 10 cents and proportionate increases on all its interurban divisions. It is proposed to put the new fares into effect on Oct. 16. Inability of the company to provide funds for repaving and track improvements and create a replacement fund of $1,016,000 annually as authorized by the state commission in 1920 are given by Bernard J. Yungbluth, president of the International, as reasons for the higher fare.

In the city of Buffalo the International Railway asks for a 10-cent fare with free transfers in place of the present 8-cent fare or two tokens for 15 cents. The local fares in Niagara Falls, Lockport, Lancaster and LaSalle would be increased to 8 cents or two tokens for 15 cents in place of the present 5 and 6-cent fares. Children under five years would ride free and children between the ages of five and twelve years would be required to pay a 5-cent fare in place of the present 3-cent charge.

Interurban rates will be on the 3-cents-a-mile basis, with a minimum cash fare of 10 cents. The Buffalo to Niagara Falls fare would be 70 cents; Buffalo to Lockport, 75 cents; Buffalo to Olcott, $1.15; Buffalo to Depew or Lancaster, 25 cents; Buffalo-Englewood commutation, $5 a month; Buffalo to Depew or Lancaster commutation, $7.50 a month. Tolls across the upper steel arch bridge at Niagara Falls and the Niagara River Bridge at Lewiston will be 10 cents one way or 15 cents round trip for pedestrians, instead of the 10-cent round-trip charge as at present: automobile with driver 25 cents and additional passengers 10 cents each.

Mr. Yungbluth said:

> Buffalo's transportation system must be financially sound and its credit good before it can extend and improve. The International has been losing money since 1918. Its stockholders have received no dividends since 1918 but have contributed $4,140,445 to the company. Based on a formula adopted by the Public Service Commission in 1920, the company should have set aside $1,016,000 annually to pay for renewals, replacements, etc., but the International has not earned this money.
>
> There is an increasing demand in each of the municipalities served by the International for street repaving and track reconstruction. This cost in Buffalo alone would exceed $2,000,000. The Public Service Commission has ordered this work done in Grant Street and Walden Avenue, but the commission did not provide for this cost in the present fares, which makes an increased fare now necessary.
>
> Street car riders in New York State are required to build roads for automobiles, motor trucks and other traffic. This paving is not used by the street cars. The paving charge, relic of horse-car days, is a far greater load on the car rider today than originally. The car rider is still required to pay the cost.
>
> No business can long continue if its product is sold at a loss. The product of the International is transportation, which has a cost just as definite as that of any manufactured article. The cost is higher than the selling price represented by the fare. Transportation cannot be given unless its cost is met.

In 1920 the International Railway was authorized to abandon the 5-cent fare in Buffalo and to charge 7 cents with four tokens for 25 cents. In February, 1925, the fare again was increased to the present rate of 8 cents with two tokens for 15 cents. Last year the company applied for a rehearing and a higher fare. The rehearing was held by the state utilities board but the higher fare was denied. On that occasion the commission by a divided vote set the company's valuation in Buffalo at $22,000,000 for fare basis, and the company's claim of a valuation of $96,000,000 was rejected.

New Proposal Presented in Chicago

Lisman & Company Behind Syndicate Which Would Take Over Surface Lines on Twenty-Year Franchise—Special Committee Will Work Out Tentative Grant

STATEMENTS recently attributed to Charles E. Mitchell, president of the National City Bank, New York, that "New York bankers will not mix in Chicago politics to straighten Chicago's traction tangle" to the contrary notwithstanding, Frederick J. Lisman, president of Lisman & Company, and Judge John M. Harlan, New York, representing a group of New York and Chicago bankers, personally appeared before the local transportation committee of the Chicago City Council on Sept. 13 to present a plan for the solution of the city's transportation problems. Still silent as to the identity of their clients, both men declared the plan to be "the finest traction offer ever made to this or any other city."

Briefly, the representatives of the syndicate proposed, first, that they shall receive a twenty-year franchise. Then they will form a new company to take over the properties of the Chicago Surface Lines at the present capitalization of $163,000,000. To pay for these they will issue new bonds running for 50 years in two series. First mortgage bonds will be awarded to present holders of first mortgage bonds of more than $90,000,000 and general mortgage bonds to present holders of junior securities of about $60,000,000. The syndicate obligates itself to supply an aggregate of $50,000,000 for extensions, new equipment and other improvements. These obligations will be an equal lien with the first mortgage bonds, but will run for only twenty years. All the securities would bear 5 per cent interest.

The plan provides that this $50,000,000 shall be amortized in twenty years and a sinking fund will be created to amortize the present capitalization in 50 years. Fares would be based on cost of service, but the present 7-cent rate would prevail at the outset. Whenever the franchise expires and is not renewed the 50-year bonds become due and payable, but if the company continues to get franchises for a total of 50 years the entire system becomes the property of the city without charge. The city would also be given the right to purchase the system at any time at a price agreed upon in the proposed franchise.

In addition to operating the Surface Lines, the bankers ask the right to operate buses, agree to operate the subways when built and agree to operate the elevated lines when they are made a part of the new company. They also offer to build the subway at cost, plus a reasonable construction profit, or build them for a sum fixed in advance. Mr. Lisman announced that the syndicate had already retained the firm of Parsons, Klapp, Brinckerhoff & Douglas as engineers to have charge of subway construction.

Local bankers and traction officials, invited by the City Council to attend the conference, discussed the new proposal freely. John E. Blunt, vice-president of the Illinois Merchants' Bank, pointed out that the proposal gives priority in payment to the proposed $50,000,000 to be invested in the next twenty years over the $100,000,000 invested in extensions, improvements and rehabilitation in the last twenty years. "That is unfair to the present bondholders," he declared.

Mr. Lisman and Judge Harlan, however, insisted that they would give present security holders a better bond than they now hold, because there would be a sinking fund to amortize part of the bonds under the new plan. "Under present conditions," Mr. Lisman said, "when the franchise expires next February, the security holders have no assurance of being paid. We offer a plan which insures them payment and a better market value than ever."

Leonard A. Busby, president of the Chicago City Railway, told the committee that he believed such a scheme could be financed in Chicago or any other large city within 30 days on the same terms proposed by the syndicate.

"Instead of $50,000,000 being needed for extensions, etc., however, something like $275,000,000 will be required in the next twenty years," he explained.

At the conclusion of the presentation, the Aldermen decided to create a special committee to confer with the Eastern bankers to work out a tentative ordinance along the lines suggested.

So favorably impressed with the new proposal were a number of the Aldermen that they succeeded in temporarily postponing negotiations with Chicago bankers and traction executives.

At the last conference between the City Council and the local traction interests on Sept. 10, Melvin A. Traylor, president of the First National Bank of Chicago, warned the city that unless the companies are given a franchise that will permit them to make money, they cannot extend their lines or improve service.

"The people of Chicago are getting good telephone, light and gas service," he asserted, "because those companies are making good money. Don't think you are going to get traction service below cost; it can't be done."

Declaring that street car riders in Chicago had paid $5,061,372 in the year ended Jan. 31 last and $52,805,573—or three-fifths of 1 cent on every fare collected—in the last twelve years for expenses other than the cost of transportation, Leonard A. Busby, president of the Chicago City Railway, vigorously denounced the practice of burdening the Surface Lines with paving and street cleaning costs. The figures he submitted showed that car riders have paid in the last twelve years $7,052,158 for cleaning and sprinkling of streets and removal of snow and ice, $4,265,077 for the maintenance of pavements, $7,066,492 for new pavements and renewals, $427,656 for moving of tracks because of sewers, $1,280,491 for moving of tracks because of street widenings, $1,635,000 for the board of supervising engineers, $23,441,379 as compensation to the city, and another item of $7,637,320 as interest on paving costs placed in the railway capital account.

The net result of Mr. Busby's eloquence in behalf of the unduly burdened car rider was the adoption of a motion by the committee declaring it the future policy to prevent any charges against operation not transportation costs.

The Aldermen did not immediately decide, however, just what items should be eliminated from the carfare or what part of each item. When they do, it is probable they will specify that the capital account shall be decreasd by the amount of the additional net revenue rather than permit this estimated $5,000,000 to be used for the payment of dividends.

New Toledo Grant Introduced

Toledo's new street railway and bus franchise ordinance amending and extending the Milner service-at-cost plan has been completed and turned over to the City Council. It was drawn up through co-operation of Frank M. Dotson, city law director, and Dewey C. Bailey, counsel for Henry L. Doherty & Company, with the advice and aid of Prof. Henry E. Riggs for engineering counsel and Newton D. Baker, Cleveland, for legal opinion. In Council the grant was immediately referred to the rules, by-laws and ordinances committee, which has called the first hearing for Sept. 22.

The ordinance is the outgrowth of a survey made by Professor Riggs a year ago following an open meeting of citizens at which remedies which would secure lower fares, extensions of lines and better service were demanded.

Wages Unchanged in New Jersey

The new three-year agreement covering the wages of the operating forces of Public Service Railway, Public Service Railroad and Public Service Transportation Company was signed on Sept. 13 by President Thomas N. McCarter on behalf of the companies and by the presidents of the nine locals of the Amalgamated Association on behalf of the men.

The agreement provides a wage scale of 65 cents an hour for all operators in service a year or more, the rate now prevailing, for classification and uniform wage scale for employees other than trainmen and makes several modifications in working conditions asked for by the men.

The terms of the agreement were reached after long negotiations which culminated during the week ended Sept. 11 in a two days conference between the officers of the companies and the state conference board of the Amalgamated Association, assisted by Vice-President William B. Fitzgerald and John H. Reardon, member general executive board. The conditions that were fixed were ratified by a two to one vote in a referendum of the employees, members of the association, held on Sept. 11.

$700,000 for Service Improvements in Milwaukee

Following closely on the heels of the Railroad Commission's order permitting the installation of one-man cars on the Wells-Downer line by the Milwaukee Electric Railway & Light Company commencing Oct. 1, came the application of the company for permission to use one-man cars on its Oakland-Delaware line. Like the Wells-Downer line, only partial use will be made of the one-man car on the Oakland-Delaware line in order to provide the additional service ordered by the commission. In the case of all lines where the service is not up to commission standards, it is expected that the company will ask that such additional service be provided by the installation of one-man cars. The number of cars the company will add to the present Oakland-Delaware schedule was not made known. This line is one of a number of lines in Milwaukee for which the commission recommended increased service in its survey. Should the commission approve the installation of one-man cars on the Oakland-Delaware line, there will be seven one-man car lines in Milwaukee, with four of them passing through the downtown section.

Another important development is the order of the commission directing the company to purchase 40 new cars. Arrangements have already been made by the company for cars identical with those now in service on the recently installed one-man lines, except that there will be some improvements in equipment as well as four additional upholstered seats. The cost of these new cars approximates $700,000, including increased power capacity and car station facilities. In its general survey the commission recommended the addition of 70 new cars, but the company complained that with this and certain rail extensions believed by it to be unnecessary the cost would be $1,971,000, which would reduce the company's net income to 3.6 per cent.

The commission's order provides that these additional 40 cars shall be in service by Dec. 1, 1927, but President S. B. Way has promised delivery and installation of fifteen cars by Dec. 1, the second lot by Dec. 20 and the remaining ten the first week of the new year, fully a year in advance of the time set by the commission. Mr. Way believes that as the result of improving scheduling and methods of operation he has ample cars to comply with commission standards.

$40,000,000 Subway Planned for Cleveland

Don Rennels, in a copyright article in the Cleveland *Press*, says that incorporation papers will soon be issued to the Cleveland Subway Company. Some of the facts given by the *Press* are:

That a subway for the west and southwest sections of the city is contemplated as well as for the east and southeast.

That the plans call for a subway that will cost considerably less than $4,000,000 a mile.

That a New York bank has agreed to finance the proposition to the extent of $30,000,000, even $40,000,000 if necessary.

That the Rockefellers, Sr. and Jr., are interested in the proposed new plan.

That the Cleveland Railway looks with favor on the plan and has indicated it would lease and operate the subway after it has been built.

That the franchise and charter ordinances now are being prepared and will be presented to City Council at the earliest possible moment.

Mr. Rennels said that it was understood that the bank behind the project was the Equitable Trust Company. Officials of the Equitable Trust Company at New York stated that they have been negotiating with Cleveland interests for financing the construction of a subway system in that city, but that there is nothing definite to announce at this time and no financing is in sight just now.

Theater in Portland Carries People Free

The management of the Broadway Theater, Portland, Ore., celebrated the opening of its $1,000,000 theater recently by giving free rides for one hour one evening on street cars and buses. For this purpose the theater company took over all the street cars and buses of the Portland Electric Power Company between 6:30 and 7:30 p.m., no fares on any line being collected during that time. A 50 per cent addition to the regular equipment of the P. E. P. company was necessary, this being practically equal to rush hour facilities. The service applied to incoming cars and buses only. A street carnival and general festival activities were participated in by the public as guests of the theater company.

How Madison Determined the Proportion of Multi-Riders

Reference was made in the ELECTRIC RAILWAY JOURNAL for Aug. 14 to what was termed a "weekly pass" trial at Madison, Wis., on the system of the Madison Railways. Additional facts show that this was not a pass installation of the usual type, but was a four weeks trial to determine how many persons could be classified as multi-riders, viz., agents, solicitors, delivery boys, etc. This test was made by charging an unusually high price for the pass and by limiting its use to the person whose name was signed thereon.

With regard to price, it should be stated that while the cash fare at Madison is 8 cents, about 60 per cent of the patrons ride on tokens, sold seventeen for $1. At $1.25 the pass cost 21¼ fares of the type that would be paid by a fairly regular user of the cars. A further limitation was that the pass was not valid on the company's buses, while tokens (without transfer privilege) are.

During the four weeks in August that the plan was effective the management gave ample publicity thereto and stimulated its platform men to sell the pass by offering a week's vacation with pay to the top man. Despite this wholehearted effort, the largest number of passes sold in any one week did not exceed 250. The average sale was 210. On the whole, the pass with the test limitations imposed appealed to only 2 per cent of the company's patrons.

Surface Lines Seek Insurance Benefits

Indication that the trainmen and shopmen of the Chicago Surface Lines would ask their employers for a weekly sick benefit, the maintenance of a substantial death benefit fund and other concessions similar to those recently awarded employees of the Chicago Rapid Transit Company after prolonged arbitration was made during the week ended Sept. 11, by William Quinlan, president of the Chicago local of electric railway conductors and motormen. Since a board of mediation rejected on Sept. 4 the elevated men's demands for a wage increase of 5 cents an hour representatives of the surface lines employees have shown no disposition to press their demand for a similar increase in pay.

Joplin Returns to Five-Cent Fare

Almost a 6 to 1 majority in favor of the proposal of the Southwest Missouri Railroad for exclusive handling of Joplin's public ransportation by street car with a return to the 5-cent fare was given by the voters of that city in a special election recently. A counter proposal to return to buses was defeated by equally as substantial vote.

The street car proposal received 3,174 favorable votes and 636 unfavorable. On the jitney proposal, 577 voted yes and 3,009 voted no.

The return to the 5-cent fare was made effective at once.

While a return to the 5-cent fare is made in Joplin the railroad has not considered a reduction of the intercity rate. The intercity rate increase was obtained solely because of the 8-cent fare in the Joplin city zone.

Michigan Monorail Plan Revived

Thirteen men, appointed by the City Commission at Port Huron, Mich., will investigate in conjunction with the commission and report on the proposed construction through Port Huron of a monorail railway system. F. J. Potter, consulting engineer of the Rapid Transit Corporation of America, a Delaware concern, addressed the commission recently in an effort to obtain the sanction of the city for a right-of-way through the city. The company has ambitious plans to construct a belt line monorail system connecting Port Huron with Detroit, Lansing, Saginaw, Bay City, Grand Rapids and other Michigan cities with Chicago and Toledo.

Ancient Franchise Clause Stirs Up Trouble in Sedalia

The future of the railway in Sedalia, Mo., is very uncertain. There is talk of abandonment and bus substitution, but no definite plan of procedure has been announced by the City Light & Traction Company. The present state of affairs is in the nature of a controversy between the company and the city over paving obligations and franchise requirements.

Recently the company was called upon to comply with the terms of its franchise when the city took the preliminary steps to pave West Sixteenth Street for a distance of seven blocks, the street being one traversed by the company's Sixteenth Street car line. This franchise provision states that when the City Council declares it essential to pave a street occupied by car tracks the company must at the same time pave with like material the space between its rails and 1 ft. on the outside of each rail. If the company should fail to comply with such paving ordinance the city reserves the right to remove the car tracks and proceed with the paving of such street as though no tracks existed therein.

The company did not feel justified in making the expenditure for the west Sixteenth Street work and invited the city to avail itself of the provision of the franchise to remove the tracks. This opened the subject for constructive public discussion and investigation, with the result that the Mayor, Council and many people reached the conclusion that the removal of the railway and the substitution of bus service therefor in a town the size of Sedalia (25,000 people) would be a step forward and in keeping with the present trend. A semblance of an agreement was reached between the city and the company and later seven blocks of track on Sixteenth Street were removed by the city.

The company, however, has not obligated itself to supply bus service when the railway lines are removed, and as yet no other responsible interest has come forth with a proposal to do so. The entire issue is proceeding constructively as between the company and the city authorities, but it is not clear what will be the future action with respect to other lines.

Salt Lake Road Not Entitled to Share Freight Agreement

The Salt Lake & Utah Railroad, Salt Lake City, Utah, was denied the privilege of sharing in a freight agreement, or being an intermediate participating carrier in the routing of westbound traffic, by a decision of the Interstate Commerce Commission. The commission's decision terminated an arrangement begun in July, 1919, when the Salt Lake & Utah became a participating carrier in transcontinental traffic, under freight rate authority of the director-general of railroads. Transcontinental rail carriers having lines which traverse the same territory told the commission that delays had been encountered constantly in moving traffic over the line of the Salt Lake & Utah. Where the line acted as an intermediate carrier of westbound transcontinental freight, steam roads accorded it 10 per cent of the proportion of the through rate, applicable west of the Missouri River, on business originating west of that line. The Sale Lake & Utah sought the same divisions on eastbound through traffic.

New Rates on South Shore Line

Through commutation rates between downtown Chicago and points on the Chicago, South Shore & South Bend Railroad were put into effect on Sept. 16. Included in the new fares are ten and 25-ride bearer tickets, 54-ride individual monthly tickets and 500 and 1,000-mile mileage books. The mileage books and the ten and 25 ride bearer tickets are good for use within one year from date of purchase.

The new passenger tariffs, which will provide greater convenience in commuting from Hammond, East Chicago, Gary, Michigan City and South Bend to Chicago, are made possible through an operating agreement with the Illinois Central Railroad, over the tracks of which company South Shore line trains now operate electrically from Kensington to Randolph Street, Chicago, a distance of 15 miles.

Attitude of Employees Studied on Chicago "L"

With the information obtained from its house-to-house survey and analysis of the public reaction toward the company, the second step by the Chicago Rapid Transit Company was to obtain definite information on how the employees handled customers. To accomplish this a force of investigators rode around on trains and asked them many questions. The correctness of the information given was noted, the manner in which it was given, the appearance of the employee and other points. When all the data were compiled and analyzed, groups of employees were called together and the results of the investigation shown them. The response was immediate and gratifying. They entered into the spirit of the "Service Improvement Program" and offered many valuable suggestions. They showed a willingness to co-operate with the management in giving customers the best service possible. The result of this work, still being carried on, is reflected in better service to "L" riders.

Weekly Pass in Des Moines

Institution of a weekly pass to sell at $1.25 and good for any number of rides during the seven-day period following its purchase was announced by F. C. Chambers, president of the Des Moines City Railway, Des Moines, Iowa, effective Sept. 20. The passes will be sold by conductors on the cars. They can be used by any number of persons for successive trips. In other words, as President Chambers pointed out, a pass will take its bearer anywhere on any line on the system as long as he presents it within the prescribed time limit.

The weekly pass will be quite similar to the Sunday pass, which was instituted several weeks ago, and was recently extended to include holidays. Mr. Chambers stated that the company's favorable experience with the 25-cent Sunday pass prompted the proposed trial of the weekly pass.

Announcement of the pass has met with wide favor among regular street car patrons and from occasional riders. It was emphasized that persons who ride the cars twice daily six days a week at 10 cents a trip can for 5 cents additional secure unlimited transportation all over the city.

Mr. Chambers hopes that use of the weekly pass will stimulate passenger traffic in the "lean" hours and result in more continuous use of the company's facilities. The moving picture houses are already showing slides urging patrons to use the passes to visit the film shows.

New Proposition Made to Chautauqua Residents

The Chautauqua Traction Company, Jamestown, N. Y., and allied railway lines have submitted a proposal to Dr. Arthur E. Bestor, president of Chautauqua Institution, and Alfred C. Davis of the West Lake Association offering to sell the Chautauqua station for $25,000 and to lease all stations, tracks and overhead structures of the abandoned Chautauqua Traction line for the nominal sum of $1 a year to any corporation which the institution and the residents of the west side of the lake may organize.

The plan suggested by the traction company is that the organization formed by the institution and the west side residents construct a link between the old Chautauqua line and the company's Jamestown and Westfield lines. The cost of this link is estimated at $15,000. Also that either that organization should operate the cars or the Jamestown, Westfield & Northwestern Railway, one of the allied companies, would undertake to operate them for it.

Dr. Bestor said it seemed to him that the offer was no different from the one submitted last winter which was rejected by Chautauqua and property owners along the west side of the lake. He said that the institution was not interested in any proposition that involved a revival of the Chautauqua Traction line as a separate corporation, and that a line on the west side of the lake could not be operated without a loss unless tied up with the management of the Jamestown, Westfield & Northwestern Railway.

Early this year the Public Service Commission approved the petition of the Chautauqua Traction Company for permission to abandon its trackage between Mayville and Ashville.

Fares Reduced for Trial Period

A trial reduction of fare from 7 cents to 5 cents in local zones was put into effect on Sept. 1 by the Webster, Monessen, Belle Vernon & Fayette City Street Railway operating between Charleroi and Ellsworth and Charleroi, Monessen and Belle Vernon. Books of 100 tickets were sold for $5 and may be used by any member of the holder's family. The special rate will be tried during a period of 60 days, and will be made permanent if increased revenues justify the reduction.

Course in Accident Prevention at New York University

The first collegiate course in accident prevention will be offered this month at New York University, according to an announcement by Arthur Williams, president of the American Museum of Safety, which will also co-operate with the university. Because of the increase in the number of industrial and public accidents, and in response to the demand from all parts of the country for trained leaders in safety work, this university is planning to train many women for leadership in accident prevention. Mr. Williams said that the need now was for men and women with the qualities of leaders and organizers and with the training of safety engineers and public safety directors, such as would be offered by the New York University.

The course will be given under the direction of C. W. Price, vice-president of the Elliott Service Company, formerly general manager of the National Safety Council and director of safety International Harvester Company.

The subject matter is divided broadly into industrial safety and public safety.

Reconstruction Activities Continue at San Diego

The San Diego Electric Railway, San Diego, Cal., continues to express its faith in the future of electric railway transportation in San Diego by continuing reconstruction and rehabilitation of existing rail facilities and providing for extensions.

The Woolman Avenue extension has just been completed at a cost of nearly $70,000, adding about 1 mile of new track in paved streets. The company's standard type of construction in pavement, consisting of steel ties, concrete ballast, drain tile and heavy steel, was used on this work.

The company is now undertaking the reconstruction of the Imperial Avenue line, comprising 2,446 ft. of double track and totaling approximately 5,234 ft. of equivalent single track, including 146 ft. of crossovers and 196 ft. of branchoffs. Steel tie construction is also planned for this work, which is made particularly intricate on account of necessity of providing for considerable special work leading from the main line to the carhouse. This work is estimated to cost $75,000.

Report Against $2,000,000 Subway for Cincinnati

A report from Colonel Sherill, City Manager, recommending the city not to undertake construction of a subway for street cars under Broadway and East Fifth Street, as proposed last spring, has been referred by the City Council to its finance committee.

Colonel Sherill said in his report that the building of the subway from the Gilbert Avenue viaduct to Government Square had been investigated from three angles, an estimate of cost made by the Foundation Company, New York, a survey of its value as a traffic time saver by the railway and city street and traffic officials, and a research into the legal phases of the scheme.

The report on the cost placed it at $1,968,000. Colonel Sherill said that this amount showed that the subway would cost far more than its actual value to the city warranted. He said that the experts of the Cincinnati Street Railway estimated that the subway would save only four minutes in running time for street cars traveling from the Gilbert Avenue Viaduct to Government Square. It also was pointed out that the four lanes of traffic on the Gilbert Avenue Viaduct, even now a "bottle neck," would be reduced to two through the building of the street car entrances to the subway.

The running time for street cars over the route is from nine to thirteen minutes.

News Notes

Service Resumed in Walla Walla.—Following closely upon the discontinuation of the bus service by the Walla Walla Transit Company, Walla Walla, Wash., comes the announcement that the company will resume operation with small vehicles to replace the large buses which were put on the run last January. Lack of patronage was given as the reason for discontinuance of service. The Walla Walla Transit Company succeeded the Walla Walla Valley Railway early this year. The railway company was served with official notice on Sept. 3 that it would he held responsible for carrying out the terms of its franchise to the extent of removing or paving over the rails, which it has recently abandoned. The railway's franchise was not canceled by the city, officials stated; the city permitted it to be transferred to the Walla Walla Transit Company, which operated buses in the city. The situation in Walla Walla has been the subject of review previously in the ELECTRIC RAILWAY JOURNAL.

Rerouting Speeds Service. — Faster service was put in operation on Sept. 13 by the Minneapolis & St. Paul Suburban Railroad, Twin Cities, Minn., between St. Paul and Stillwater. This general speeding up was accomplished by rerouting in the St. Paul loop and installation of a siding in North St. Paul. Except from 4 to 6 p.m. the time will be shortened six minutes. This is a single-track line with passing tracks from the St. Paul limits eastward.

More One-Man Cars in Service.—The Western Avenue line at Toledo, Ohio, has been equipped with one-man cars remodeled in the shops of the Community Traction Company. Operation started on Sept. 15. It is estimated there will be an operating saving of about $12,000 a year under the new plan. This is the fifth Toledo line to be put on the one-man plan.

Subway Strikers Affiliate with Amalgamated.—Edward P. Lavin, leader of the recent strike of motormen and trackmen on the subway division of the Interborough Rapid Transit Company, New York, has announced that the Consolidated Railway Workers, as the strikers' organization was called, had become a branch of the Amalgamated Association, affiliated with the American Federation of Labor. One charter from the Amalgamated will be held to cover the entire Interborough system.

Fares Reduced in Texarkana.—The Southwestern Gas & Electric Company, Texarkana, Ark., is selling tickets at four for 25 cents for adults and children's tickets at three for 10 cents. This is a substantial reduction in the former rates when tickets for adults were 7 cents and those for children 4 cents.

Public Utility Course Open.—Under the terms of the will of the late George H. Leatherbee the course in public utility management at the Harvard Business School will be open without charge to properly qualified business men. The course, which will meet from 12 to 1 o'clock three times each week, will deal with the complex legal, economic and financial phases of public utility management. A study will be made of court and commission decisions showing the extent and method of public utility regulation, and later cases will be considered illustrating methods of marketing operation, finance and customer relations. Applications should be made in writing to the office of the school, 17 University Hall, Cambridge, Mass.

"Don't Get Hurt" Campaign. — The Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., is now conducting a "don't get hurt" campaign which is distinctly educational. The object is to spur the patrons of the road as well as the conductors and motormen to exercise such care as is necessary to prevent accidents. It is said that no other railway in the state has a more careful group of conductors and motormen than the company which serves the Lower Peninsula. However, the people at large are urged to learn the great lesson of self-reliance as a prerequisite to self-protection, and that is the lesson which the promoters of the "don't get hurt" campaign hope to teach to the patrons and operators.

New Fare in Effect.—The Binghamton Railway, Binghamton, N. Y., put into effect on Sept. 15 a readjustment of its fare zones, which means a reduction in fares between Binghamton and Endicott. The new schedule extends the present westbound zone from Binghamton to the Erie underpass at Westover, on which the fare will be 7 cents. The present western limit of that zone is Riverside Drive, Johnson City. By the change passengers will be able to ride from any point in Binghamton, Port Dickinson or Hillcrest to the Erie underpass for 7 cents. At the present time it costs 14 cents. The Endicott zone will extend from Floral Avenue to West Endicott and a cash fare of 7 cents will be charged. The return trip ticket now costing 15 cents will be abolished. At present it costs 29 cents to ride to Binghamton and return to Endicott. The Public Service Commission will call a hearing on the proposed new schedule.

Foreign News

Brisbane Has Deficit After Fixed Charges

The Municipal Tramways of Brisbane, Queensland, reports a net revenue from operation during 1925 of £142,926. After the amounts required for interest (£80,514), sinking fund (£15,358), depreciation (£59,439), and amortization (£14,000) are deducted from the net revenue, the debit balance for the year is £26,395. Operating revenues and expenses for the last three years are given in Table I.

The property was taken over from the Brisbane Tramways, Ltd., on Dec. 31, 1922, for £1,400,000. Since that time the Court of Industrial Arbitration has increased the wages and holidays and reduced the working hours of the staff to the equivalent of and addition of £40,000 per annum. More service has been installed, but there has been no increase in fare for six years and then only the establishment of a minimum 2d. fare on Sundays and holidays. Table II shows a comparison of capital spent and net earnings in Brisbane and other cities in Australia, as given in the Brisbane report. This report says that after provision for sinking fund, depreciation account, etc., is made, each of the four other cities shown in the table would have reported a larger deficit than Brisbane.

During the year 26 new cars were added. The present standard is center entrance car, somewhat like the "California" type, with a closed compartment at each end and open compartment with six stationary benches in the center. These benches are arranged in groups of two, back to back. This car seats 64 passengers and weighs 507 lb. per seat. Steel tired wheels are now used exclusively. At the end of 1925, the system comprised 85.5 miles of track and 50.3 miles of route. The tramways still have to do a large amount of paving, although they have no income tax to pay.

Considerable space is given in the report just issued to the motor bus situation in Brisbane. During the year 11 buses were purchased. In addition, at the end of the year, 40 private buses were operating in Brisbane. In an appendix to the report G. R. Steer, general manager tramways department, discusses at length the relative merits of buses and trams in city service.

In this statement Mr. Steer quotes various authorities, including articles in the ELECTRIC RAILWAY JOURNAL, on the place of the bus in city transportation service. He also gives figures on the cost of bus operation from Melbourne and Adelaide, the only other cities in Australia where buses are operated by the tramway authorities and operating reports are available. In Melbourne, 44 buses for the year ended June 30, 1925, showed a profit of £3,224 without any charges for interest and depreciation. In Adelaide, with 40 buses, the loss from March 25, 1925, to Jan. 31, 1926, was £8,820, including all charges. The conclusion of Mr. Steer is that for the present at least "neither trackless trams nor motor buses can cope with the growing traffic of Brisbane as well as large electric tramcars of modern design."

TABLE I—OPERATING REVENUES AND EXPENSES 1923-1925

	1923	1924	1925
Operating revenues	£628,841	£663,747	£706,520
Operating expenses	£443,885	£536,989	£563,604
Net revenue	£184,956	£126,758	£142,916
Operating ratio, per cent	70.59	80.90	79.77
Passengers carried	74,721,594	78,367,194	82,514,979
Car-miles run	5,212,971	5,457,800	5,915,844

TABLE II—INVESTMENT, NET REVENUE AND THEIR RATIO, VARIOUS AUSTRALIAN CITIES

	Capital Spent	Revenue Net	Ratio Net Revenue to Capital*, per Cent
Brisbane	£1,690,130	£142,916	8.46
Sydney	7,713,143	506,843	6.57
Melbourne (electric)	3,242,485	106,519	3.29
Adelaide	2,563,568	164,688	6.42
Perth	932,317	45,604	4.89

*Before deduction of interest on investment, sinking fund payments or depreciation.

TABLE III—TRAFFIC STATISTICS, VARIOUS AUSTRALIAN CITIES

	Per Car-Mile				Operating Ratio, Per Cent
	Operating Revenue d.	Operating Expenses d.	Net Revenue d.	Passengers Carried	
Brisbane	27.52	22.86	4.66	13.95	79.77
Sydney	26 45	21.87	4.58	10.40	82.66
Melbourne (electric)	21.36	18.50	2.86	9.54	85.91
Adelaide	20.77	15.12	5.65	8.78	71.71
Perth	22.23	18.63	3.60	9.50	83.81

Recent Bus Developments

Additional Buses Acquired by San Diego Electric Railway

Due to increasing traffic on existing bus lines and contemplated extension of one such line into outlying residential districts, together with recent inauguration of feeder service on another rail line, the San Diego Electric Railway, San Diego, Cal., has found it necessary to add to its bus equipment and has just received three new Fageol Safety Coaches, making a total of thirteen Fageols and two Dodge-Grahams in the city fleet.

The company now operates one route completely by bus, with terminus in the downtown business district, with transfer privileges to the rail lines, and in addition maintains three feeder lines to rail lines and one line serving new territory, but connecting with three converging rail lines about midway to the business district. All of the bus operations are conducted as a part of the rail system, at identical rates of fare, with transfer privileges. The fares, however, are based on the zone system, so that in some instances bus extensions automatically create another fare zone, bringing in more revenue in addition to increasing the business to the existing rail lines.

New Minneapolis Bus Service Starts Oct. 1

Due to delay in getting electric equipment for the gas-electric buses which it is to put into service in Minneapolis, Minn., the Twin City Rapid Transit Company will postpone operation of these buses until Oct. 1. The chassis are being made in Chicago and the bodies in Minneapolis. The new line will cover the territory from Bridge Square to Hennepin Avenue and 36th Street. Supervision of the other proposed routes is a duty of the park board, which has not yet acted upon the application for extension of this line over parkways. Other buses will be put in operation in the fall to Bryn Mawr, on 38th Street and Lowry Avenue, as extensions or connections of existing electric lines.

Further Entanglements in Buffalo Bus War

Municipal bus lines of Buffalo, N. Y., are operating at a daily deficit, according to a report submitted to the City Council. The original appropriation of $10,000 has been exhausted, and while there was $2,315 in the treasury on Sept. 15, bills aggregating more than $4,000 remained unpaid, for which Mayor Frank X. Schwab, sponsor of the municiapl buses, said he would ask the City Council for another appropriation. From July 12, when the first buses were placed in service, until Sept. 13 total receipts aggregated $8,494. On the basis of the 8-cent fare, this indicates that upward of 10,000 persons were carried on the lines.

Other members of the Buffalo City Council, indicating their opposition to Mayor Schwab's plan of municipal buses, said they would refuse to approve another appropriation because they claim the operation of municipal buses is illegal and they feared the expenditure of public funds for an illegal enterprise would result in prosecution and the added probability that they would be called upon personally to repay this money into the city treasury.

The bills submitted to the City Council revealed for the first time that Mayor Schwab has a contract with John C. Montana, who operates interurban and sightseeing buses from Buffalo, to pay him $50 per day per bus. The White Motor Company presented a bill for $4,354. The Ohmer Fare Register Company was paid $380 for fare-recording machines.

When Mayor Schwab found that other members of the City Council opposed continuation of the service, which is in direct competition with that furnished by the International Bus Corporation, a subsidiary of the International Railway, he called a conference in his office in the City Hall of individuals who might be interested in organizing a new bus company to take over the management of the city-operated machines. A few responded and the Mayor said a company is soon to be incorporated to operate single-deck buses over several routes providing the necessary consents can be obtained. The Mayor assured the prospective investors that he would see that they received a franchise from the city.

City-Wide Bus Proposals Favored in New York

Board of Transportation Files Sixth Report on 106 Petitions from 72 Applicants—Only Four Bidders Would Cover Metropolis with Lines—Street Railways Severely Criticised

THE Board of Transportation submitted a 1,088-page report to a special meeting of the Board of Estimate of New York on Sept. 15 on the proposal to award bus operation franchises to private corporations. The report makes only two definite recommendations of prime importance. They are, first, that the franchise be awarded only to a corporation of great financing ability and for city-wide operation only, and, second, that there be strict adherence to the 5-cent fare principle, with a possible charge of 2 cents for transfers.

On the basis of the present bids the Board of Transportation indicated that the offer of the Equitable Coach Company was the most favorable in that it is the only one that comes anywhere near meeting the rigid conditions, but the way is left wide open for further negotiation with other concerns eager to enter the bus transportation field.

The report was presented by Commissioner Ryan. It was referred to the committee of the whole without comment. The next step to be taken in the consideration of the report by the Board of Estimate and Apportionment will be to determine which, if any, of the proposals is acceptable, then adopt a form of contract or franchise and advertise it for fifteen days prior to a date for a final vote by the Board of Estimate on the granting of the franchise.

CONCERNING THE FARE

Regarding the 5-cent fare a summary of the report said:

> After reviewing all the proposals made and analyzing them minutely, the board concludes that bus operation can be maintained on a 5-cent fare. This conclusion is sustained by the fact that the Fifth Avenue Coach Company, the New York Railways and the Third Avenue Railway system, through their subsidiaries, have recently amended their original 10-cent fare proposals and now seek franchises to operate at a 5-cent fare.

Only four concerns applied for franchises to operate in all boroughs except Richmond. They were the Equitable Coach Company, the Union Bus Corporation, the Borough Motorbus Company, Inc., and the Service Bus Corporation. In its comment on the Equitable bid the commission said in part:

> The two essential requisites of financial responsibility and practical experience appear to be combined in support of this application.
>
> The initial rate of fare is universally 5 cents on all routes in the four boroughs. The proposal to divide ten long routes into 5-cent zones, out of 67 routes in the four boroughs, is superior in this respect to the proposals of existing transportation corporations.
>
> The proposal to charge 2 cents for transfers will affect one-tenth of the passengers, if the experience of street railroad operation is duplicated on bus routes.
>
> The possession of a fleet of 895 double-deck and single-deck buses will permit flexibility of operation and the adjustment of service according to necessity in rush hours.
>
> The supervision and regulation of service would be simplified by having only one company to regulate.
>
> Unity of ownership and management at the beginning of extensive bus operation in this city will avoid the baffling problem of ultimate unification which has for several years been the objective of state laws and state regulatory agencies in respect to other forms of city passenger transportation facilities.
>
> The possibility of a repetition of the financial manipulation of city franchises by means of mergers and purchase of stock control of transportation companies, attended in the past by corruption and scandal, and by loss in investors, will be minimized if only one franchise is granted and there are not several bus companies to merge.
>
> The recapture of one city-wide franchise and operating equipment will be much simpler and more satisfactory than the acquisition of a number of enterprises and a dissimilar variety of equipment, if or when the city should find it in the public interest to terminate private operation or to consolidate surface and rapid transit facilities.
>
> With one franchise holder operating in several boroughs the ability to provide interborough operation across the bridges

connecting the boroughs will be increased with resultant possibility, if deemed advisable, to connect traffic centers of different boroughs.

Taking up the various proffers of borough-wide, or less than city-wide operation, the report says of the bid of the Manhattan Surface Coach Company, affiliated with the New York Railways, the corporation operating the greater part of the surface railway lines in Manhattan:

1. The combination of the New York Railways and the Fifth Avenue Coach Company assures adequate financial resources for installation of bus operation.
2. Experienced operators of transportation facilities would be in charge of operation.
3. Two transfer points of limited usefulness would be added to the bus system.
4. Unnecessary and duplicate street car transfer points are included, many of which would be detrimental to service and would promote traffic delay on overcrowded avenues, which would probably result in the discontinuance of such transferring after the franchise is granted.
5. Bus routes are excessively zoned, thus nullifying much of the benefit of an initial 5-cent fare. The zoning plan is less advantageous than proposed by other applicants.
6. The amount of compensation offered to the city is the lowest offered by any applicant.
7. The limitation upon the right of the city to recapture is unacceptable.
8. The complication of the affairs of this bus system with the transportation affairs of Chicago and St. Louis is not desirable.
9. The remoteness of financial responsibility, extending through four intermediate holding companies to a fifth holding company incorporated in Delaware and located in Chicago, suggests a possible recurrence of the financial manipulation that has heretofore resulted in federal receiverships.
10. The history of the New York Railways and its predecessors does not inspire confidence in its financial methods, and the recent acquisition of its capital stock by a subsidiary of the Omnibus Company of Chicago resembles the manner in which the previous combinations of street railroads were organized in this city, all of which have failed with disastrous results to investors and the traveling public.
11. The lesson from past experience indicates that the city should discourage and not sanction a further duplication of transportation holding companies, and should endeavor to secure the cancellation of existing perpetual franchises in return for new limited franchises.
12. This proposal is important, but is not the best of those now pending before the board for the operation of the new bus system. The change from street cars to buses as equipment for Sixth, Seventh, Columbus and Lenox Avenues may be consummated without involving the new bus system with the tangled affairs of the street railways, and as a separate matter deserves its serious consideration.

FARE RAISE AGAIN OPPOSED

Concerning the request of the New York City Omnibus Corporation, which also involves a combination of the Fifth Avenue Coach Company with the New York Railways, the Board of Transportation declares:

Desirable as it is to bring about the cancellation of perpetual franchises and the removal of street car tracks from some of the central avenues of Manhattan, the proposal of the applicant to impose all the debt of outworn and unprofitable street car lines upon the new bus system, and to charge a double rate of fare merely for the purpose of supporting this excess burden is not deemed to be in the public interest.

To the extent that the application proposes the installation of buses, the plan of routes would provide a well-articulated bus service, which could only be instituted with the consent of the street railroad corporation that holds franchises on the avenues included.

Examination of the fare and transfer proposals will demonstrate that passengers on the new bus lines will gain nothing. A substantial financial gain would probably be realized by both the corporate partners, (a) by preserving to the Fifth Avenue Coach Company all of its existing lines operated under temporary permits and thus maintaining the present value and profits of its existing 10-cent fare perpetual bus franchises; (b) by providing for full payment of outstanding indebtedness of street car lines that are not profitable, and enhancing the value of other perpetual street railroad franchises owned by the New York Railways.

This applicant offers to pay the city 2 per cent of its gross revenues from new bus lines.

Right of recapture by the city is to be for municipal operation only.

There are more advantageous proposals pending before the Board of Estimate and Apportionment.

An individual bid made by the Fifth Avenue Coach Company for Manhattan service is condemned in these words:

The rate of fare is higher, the cost of transfers is greater, and the compensation offered to the city is less than other responsible applicants offer, and, therefore, the proposal is deemed to be unacceptable.

Of the Manhattan service bid put forward by the Surface Transportation Company, a subsidiary of the Third Avenue Railway, the board recorded this verdict:

The scheme proposed by this applicant does not conform in any way with the city plan for a co-ordinated system of bus routes that would be a substantially extensive and useful addition to existing transit facilities, for which proposals to operate were invited.

Not being in accord with the city plan, and not being an alternative that would increase transit facilities where and as they should be increased, this proposal is inferior to any other that accepts the city plan.

This company has been particularly active in agitation, and its recent letters stating that the convenience of the people would be best served by its proposal of a 10-cent fare and transfer to street cars are more extensively discussed in the analysis of its application for a franchise in the Borough of the Bronx which it has most strenuously agitated in behalf of the 10-cent fare policy.

Of the Bronx offer filed by the Surface Transportation Corporation, the report says:

1. Excessive and unnecessary zoning of routes No. 3, No. 4, No. 9 and perhaps No. 6 and No. 11 is suggested as an alternative to the original proposal to charge a 10-cent fare on these routes.
2. Curtailment of route No. 11 at the Bronx side of the Harlem River will be detrimental to the service which this route could afford if extended over 181st Street Bridge to the vicinity of 181st Street rapid transit station and business locality.
3. The amendment to the original application, except as to excessive zoning, has made this proposal one of the best as to Bronx operation only.
4. Indefinite and uncertain statements about zoning and transfers are not convincing when offered by experienced street car operators, particularly when all other applicants and investigators can readily determine suitable points of zoning. The evasion of the inquiry on these points does not inspire confidence that applicant will grant any privileges that it can avoid.
5. The argument that a 10-cent fare is more beneficial to the traveling public than a 5-cent fare cannot be sustained.
6. The contention that any benefit will accrue to the general public by the so-called co-ordinated system of street cars and buses is contrary to the fact unless a 5-cent fare is established on buses and free transfers issued to and from buses and street car lines.
7. Two-thirds of all pasengers on street cars in the Bronx do not transfer, but the applicant contends that it is beneficial to the public to charge double fare to two-thirds of passengers so that one-third can get free transfers.
8. The persistent effort to maintain a predominance of its railroad interests does not encourage belief or confidence that it would develop bus service to its full capacity or usefulness, and is an indication that an independent bus service would be more beneficial to the traveling public if adequately financed.

In its survey of proposals for Brooklyn operations the board made some drastic observations upon the application filed by the Coney Island & Gravesend Bus Corporation, the bus subsidiary of the Brooklyn-Manhattan Transit Corporation. It said:

The plan of routes proposed by this applicant is not in accord with the plan adopted by the Board of Estimate and Apportionment for a co-ordinated bus system, but as designed will not only dismember the city system into disconnected parts, but will also effectually prevent the establishment of any future bus system, there being no other available streets that are not covered by street car franchises.

The transfer privileges are so restricted as to be only equivalent to the bus transfers eliminated, and the traveling public gains nothing by a so-called co-ordination of street car lines and bus routes.

The threat of the applicant to legally contest the right of the city to grant bus franchises on streets where there are no car lines, and continue such bus routes to appropriate terminals at points of concentration of traffic, will, if carried into effect, determine whether the railroad corporations own all the public streets, settle many disputable questions about the alleged rights of public utility corporations, and prepare the way for legislation to relieve the city of any disabilities that may be revealed by such litigation. For example, if the law requiring that a certificate of convenience and necessity be obtained from state authorities as a prerequisite to the validity of a franchise grant can be construed as a prohibition against the establishment of additional service to the public on streets not named in existing franchises, the knowledge of such a condition will arouse public sentiment to demand the repeal of such a law.

The history of organization, merger, consolidation, and management of Brooklyn street railroads is a record of financial manipulation, receiverships, reorganizations and more receiverships, possible only by the possession of a multitude of perpetual franchises. It seems essential that the new method of bus transportation should be organized in such a manner that independent operation will be at all times possible, and that by issuance of short-term franchises any attempt to involve the new grants in another manipulation of securities will be discouraged.

INSISTS ON UNIFIED OPERATION

In presenting in the report arguments favoring comprehensive, city-wide and unified operation over four boroughs, the Board of Transportation declares that:

This latest investigation has strengthened the opinion previously expressed in omnibus reports that segregated operation of single routes is less advantageous to the public than more comprehensive operation, and to grant franchises for detached routes would be to dislocate the plan for co-ordinated service, result in a multitude of franchises and preclude the establishment of a comprehensive service.

A summary of the arguments favoring unified city-wide operation in four of the five boroughs is as follows:

1. One company could more effectively utilize a large number of omnibuses and provide a more comprehensive and adaptable service than a number of small units, because the inclusion of all routes in one franchise would enable the operation of equipment wherever and whenever and in the quantity that traffic necessity requires.
2. The largest amount of traffic moves from the outlying residential districts toward the terminal districts between the hours of 7 and 9 in the morning and in the opposite directions between 5 and 7 in the afternoon. During the intervening hours the heaviest traffic occurs in the terminal districts. On Saturday afternoons, Sundays, holidays, and during evening hours, the business districts are practically deserted, and the greatest amount of traffic moves toward places of recreation.
3. One company could mass the bulk of its equipment of 900 motor buses anywhere, but the limited equipment of each of several units would be restricted to operation within its local territory.
4. The four boroughs of Manhattan, Bronx, Brooklyn and Queens, being linked together by bridges, are in reality homogeneous territory for vehicular traffic and all passenger transportation service.
5. The pooling of the revenue of the most desirable and the less desirable routes will be beneficial to outlying sections of the city by making possible better service

than those sparsely settled localities could otherwise obtain.

6. One company would be under better control by regulatory authority than would several companies, because larger resources in the form of equipment would make the adjustment of service to traffic necessities much less difficult than such adjustment of small units by several owners.

7. The subdivision of the city into several franchise territories would create legal obstacles to future routing of additional service lines over important highways leading to terminal districts, similar to those which the city now encounters by reason of the existence of numerous street car franchises. The future re-location of lines of service so as to best adapt them to traffic needs will be much easier to accomplish under one franchise.

8. By the grant of one franchise the expansion of service according to the development of growing communities could be attained without conflict over franchise routes and at least expenditures for additional equipment.

9. The grant of franchises to several companies will result immediately in the creation of an incentive toward consolidation and the manipulation of stock and bond issues that have attended all previous consolidations and reorganizations of transportation companies in this city.

10. The overhead expense of one company must necessarily be lower than the combined overhead of several companies each with its officers, directors, attorneys, etc., and quantity purchase of equipment and supply will reduce overhead as well as operating expense.

11. It will be simpler and easier for the city to recapture or terminate one franchise than several franchises, if municipal operation or unification of transit facilities becomes desirable.

In the certificate of incorporation of the Equitable Coach Company, which was filed with the Secretary of State Nov. 19, 1925, the name and residence of each incorporator and the number of shares each had agreed to take were stated as follows:

Percival E. Cowan, 157 West 105th Street, one share; Oswald L. Johnston, 506 West 111th Street, one share; Fifield Workum, 59 East 82d Street, one share; Harrison S. Dimmidd, 229 Waverly Place, one share, and Ralph E. Stone, 538 West 114th Street, one share.

The incorporators were named as the directors for the first year. Percival E. Cowan, as president, signed the certificate of incorporation and Mr. Dimmidd attested the instrument as secretary.

The J. G. White Management Corportion is prepared, it is understood, to finance the Equitable if that corporation should be successful in obtaining a city-wide bus franchise.

A summary of the extent of the bus routes recommended by the Board of Transportation covered in the bids on which the Board of Transportation reported is as follows:

MANHATTAN

Total mileage all routes	52.9
Average mileage all routes	4.4

BRONX

Total mileage all routes	57.4
Average mileage all routes	4.4

BROOKLYN

Total mileage all routes	81.9
Average mileage all routes	4.4

QUEENS

Total mileage all routes	95.4
Average mileage all routes	4.1

Comptroller Charles W. Berry declared on Sept. 16 that he was not committed to a city-wide system. Although he said he had not taken any position in favor of awarding franchises by boroughs, his remarks indicated that he considered this still a possibility, despite the Board of Transportation's report. The report is understood to be satisfactory to Mayor Walker, who has been inclined all along to favor a city-wide system, but there is great doubt that a majority of the other members of the Board of Estimate agree with him. Mr. Berry said:

> I am not going to let the Board of Transportation do my thinking for me. A thousand-page report on applications for bus franchises was laid before the Board of Estimate at its meeting Wednesday, and surely no one can expect me to have read it, much less studied it, by this time. But I see by the newspapers that the report favors the city-wide bus franchise petition of a certain company, but the report says nothing, I understand, of the persons who are behind that particular application. I am not committed to the city-wide proposition, nor have I yet taken a stand as to a separate bus system in each of the five boroughs of the city. No doubt good arguments can be made for both these plans.

Mr. Berry indicated that he believed some of the proposed routes, as laid out by the Board of Transportation, might lead to litigation by surface line companies on the ground that they would compete with existing surface lines. He expressed surprise that the B.-M. T. offer to establish a bus system in Brooklyn had not received more consideration, and said he would stick to his demand for a seat for every passenger, which he expressed several weeks ago.

Another Bus Line for Oakland

Plans for a bus line between downtown Oakland and the Berkeley boundary to supplement the Telegraph and Shattuck Avenue railway service, submitted by the Key System Transit Company, have been accepted by the Oakland City Council.

The Council authorized the company to commence the service immediately for a six months experiment. At the end of this period the bus line may be withdrawn at the option of the company.

By restricting railway stops in a zone between Alcatraz Avenue and Twentieth Street, the company has promised to cut several minutes from the running time between Berkeley and Oakland. The buses will run on a regular stop schedule from Eleventh and Broadway to Alcatraz and Telegraph Avenues.

The plan just approved is identical with one submitted to the City Council several months ago. At that time it was held to be in conflict with the city ordinance permitting bus lines to be operated only as feeder or extensions to car lines.

Decision Rendered in Yonkers

The application of the Yonkers Railroad for an injunction pending trial restraining the city of Yonkers, N. Y., from selling fifteen bus routes at auction was denied on Sept. 13 by Supreme Court Justice George H. Taylor, Jr.

The railway contended that the proposed sale was illegal and prejudicial to its rights in Yonkers. It also alleged that the auction had been so arranged as to prevent the Yonkers Railroad from bidding for the proposed routes, some of which, it was contended, create illegal competition by paralleling the trolley routes.

The court held that all the objections were insufficient to warrant injunctive relief.

On Sept. 15 the court as a further move in the matter denied the application of the Yonkers Railroad for a stay to prevent the Yonkers Aldermen from awarding to the highest bidder franchises to operate fifteen bus routes in that city. Alfred T. Davison, counsel for the corporation, made the application because, he said, the company was going to appeal to the Appellate Division from the decision of Justice Taylor. The company has announced it will fight to the highest court against outsiders getting the bus franchises.

Union Station in Prospect.—Independent bus owners as well as electric railways operating buses have agreed to build a union bus station in Madison, Wis., providing a part of the recently introduced Williams bus ordinance is not enforced until Jan. 1, 1928, as they will be unable to have the station built before that time. If the Common Council will accept this modification and the ordinance becomes a law the bus station controversy will be disposed of. The proposed ordinance provides that buses will not be permitted to stand on any street for a period longer than is required to load or unload passengers. At present the downtown streets are used as stations by the bus lines, which practice has long been unpopular because of the part it plays in adding to the city's growing traffic congestion problem.

Improvements for Sightseers. — The Colorado Springs & Interurban Railway, Colorado Springs, Col., as the parent organization of the Gray Line Motor Tours Company, operating in the Pike's Peak country, is understood to be planning to use glass-topped buses for sightseeing purposes next season. This method will protect passengers from the wind and dust, but will permit unobstructed view of the wonderful canyons.

Bus Service Extended.—The bus operations of the Madison Railways, Madison, Wis., have again been enlarged. With bus lines already operating to the suburbs of Nakoma, Wingra, Tenney Park and Elmside, the company has installed another line to the rapidly growing suburb of Shorewood. Four trips will be made daily to this suburb.

New Service With School Opening.—Special bus service to and from the new Girls' High School in Atlanta, Ga., was instituted on Sept. 7 by the Georgia Railway & Power Company with the opening of school. The new service has been arranged to overcome the difficulty on the part of north side students, who last year were compelled to transfer once and sometimes twice to reach the school from their homes over the regular railway routes. Two trips will be made by the buses, which will form a special "High School" train, one in the morning going to the high school and one in the afternoon, at the close of the session, returning from the high school. It is the plan of the company to continue the system each year during the school term.

Financial and Corporate

Narragansett After Railway Plant

United Railway Company's Power System Included in Plan to Co-ordinate Utilities in Providence

Utility developments in Rhode Island took a new turn during the week ended Sept. 18 in the shape of an offer by the Narragansett Electric Lighting Company, Providence, to purchase the power plant, transmission lines and substations of the United Electric Railways for cash to be used for the retirement of the latter's bonds, and so to operate this equipment in conjunction with its own plant for twenty years as to realize the economies which could be obtained were the companies merged. As a result of the presentation of the Narragansett plan, the proponents of the Rhode Island Public Service Company merger plan, who are identified with the banking house of Bodell & Company, Providence, agreed to postpone until Oct. 15 the time required for depositing Narragansett stock in connection with their program for consolidation, this action being taken at the request of the directors of the railway.

In a letter to the railway dated Sept. 8, E. A. Barrows of the Narragansett company said that it was felt all of the advantages resulting from such a purchase could be secured without the merger of the two companies or the loss of their separate corporate identities. He said there is a widespread feeling on the part of his shareholders and the public against a merging of the two companies. He then continued in part:

> All of the economies possible under a merger can be effected through a more simple and direct method without any of the attendant disadvantages. We are, therefore, prepared to enter into negotiations to purchase your power plant, transmission lines and substations for cash, to be used for the retirement of your bonds, and so to operate same in conjunction with our plant, for a period of twenty years, as to realize the economies which could be obtained if the companies were merged; and will give you, until you are able to share the benefits with us, all the advantages of such operation with respect to the electricity purchased by you that are possible to be obtained without detriment to our customers or shareholders.
>
> We are submitting herewith a tentative plan which we think conforms to the above principle. The effects of this plan, based upon the information now available, are as follows:
>
> 1. There would be retired immediately United Electric Railways bonds of the principal amount of from $5,000,000 to $6,000,000.
>
> 2. Beginning one year after the plan becomes effective, there would be retired United Electric Railways bonds, increasing from about $225,000, principal amount, the first year, to $4,700,000 by the end of the twentieth year.
>
> 3. At the end of the contract period of twenty years there would be outstanding approximately $3,270,000 principal amount of United Electric Railways bonds instead of $14,012,300 principal amount now outstanding.
>
> 4. Beginning one year after the plan becomes effective the approximate annual interest savings to the United Electric Railways would be as follows: $11,000 the first year, $23,000 the second year, $57,000 the fifth year, $85,000 the tenth year and $235,000 the twentieth year, with corresponding increases during the intervening years.
>
> 5. In addition to the interest saving shown above, there would be an operating saving to the United Electric Railways estimated at from $41,000 to $91,000 a year after providing for the retirement of bonds as set forth in subdivisions 1 and 2 above.
>
> 6. The interest and operating savings enumerated in subdivisions 4 and 5 will inure directly to the stockholders of the United Electric Railways and the riding public. These annual savings with the initial and subsequent annual retirement of bonds will, we believe, greatly enhance the value of the stock.
>
> The above figures relative to the retirement of bonds and the saving in interest charges are based upon purchasing bonds initially and during the 20-year period of the contract at prices at which we have assumed they might be purchased.

The services of Day & Zimmermann, Inc., have been engaged to make a thorough investigation of the plan and to report as to its effect upon the United Electric Railways, the Narragansett Electric Lighting Company, the railway company bondholders and the shareholders of both companies and their patrons and customers, and to give their opinion as to whether the plan conforms to the principle set forth in the letter.

The tentative proposal has the approval of the board of directors of the Narragansett company. To make it effective will require the approval of the security holders of both companies and of the Public Utilities Commission, and it is made, of course, contingent upon such approval.

A cash offer of $86 a share for Narragansett stock payable immediately upon presentation of certificates was made on Sept. 16 by Bond & Goodwin, Inc., Boston, with whom arrangements for the stock purchase have been made by the Rhode Island Public Service Company. This offer is not contingent upon the success of the proposed merger of the lighting and railway companies through the medium of the Public Service Company, but is an alternative to the original plan announced. All stock so purchased by Bond & Goodwin will be deposited under the plan and agreement to merge when such deposit is sufficient to make the plan effective both as to the Narragansett and the railway companies. Sept. 25 was fixed as the time limit on the Bond & Goodwin offer.

Receivership Sought for Iowa Property

Application for receivership for the Mississippi Valley Electric Company, demanded by stockholders, was granted on Sept. 11 by Judge Ralph Otto of the Johnson County District Court. Henry Negus, Iowa City Attorney, was named receiver with instructions to continue the operation of the three street railway properties involved. The Mississippi Valley Electric Company is the holding corporation for the Iowa City Electric Railway, the Fort Madison Electric Company, both in Iowa, and the Mankato Electric Railway, Mankato, Minn. Inroads on railway passenger traffic made by automobiles and buses were declared to be mainly responsible for the lack of patronage which brought on the receivership. Both of the companies in Iowa used a limited number of buses.

New Angle to Seattle Tax Case

The Puget Sound Power & Light Company, Seattle, Wash., has moved to collect an additional sum from the city in the street railway tax suit which has been pending in the courts for several years. Its idea for an additional sum is based on a rule of the Circuit Court which permits a respondent an additional 10 per cent where an appellant appeals "to cause delay." If the company is successful, the city would have to pay $500,000 plus 10 per cent, or $550,000. In the street railway case, the company asks that the city pay three-fourths of the 1919 tax on the street railway. Ownership was changed from the company to the city in that year, and as the city had possession of it for nine months, the company declares, it should pay three-fourths of the tax, which the company was required to pay, under protest, to King County. The company recently won a decision in the United States Court and the city appealed to the United States Circuit Court of Appeals. The amount of the 1919 tax was about $650,000.

Short Abandonment in Amsterdam Approved

The Public Service Commission on Sept. 3 approved the application of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., for permission to abandon part of its railway lines in the city of Amsterdam. The part to be abandoned consists of 2.08 miles of the so-called Hagaman line on Forbes Street-Vrooman Avenue and other streets, all within the city.

In the memorandum accompanying the order in this case the commission stated:

> As has been said by this commission in other cases, it is the duty of the commission to protect the interests of the public. The desire of the persons residing in the section traversed by this portion of the line to keep it in operation, however, is best evidenced by the patronage given it.
>
> Proposals to abandon portions of railroad lines because of continued financial losses resulting from operation have been passed upon by the courts on many occasions. Where it has been shown that the continued operation of an unprofitable branch or portion of line would tend only to exhaust the resources of the road as a whole, abandonment has been permitted.

Omaha Bondholders Act to Protect Franchise Rights

The City Council of Omaha, Neb., has refused to retain John P. Breen as an assistant to City Attorney Van Dusen in the litigation in the federal court brought by the Guarantee Trust Company, New York, representing the bondholders of the Omaha & Council Bluffs Street Railway, to restrain the city authorities from granting permits to bus companies to operate in competition with the railway. It will be recalled that the state Supreme Court decided that these were not franchises requiring a vote of the people but a license that the Council might grant or refuse.

The Council now stands enjoined by the federal court from taking the favorable action it indicated it would do with the buses, and the case, in the present crowded condition of the federal court calendar, will not be reached for six months. The petition has been drawn sufficiently broad to cover franchise litigation as well as bus rights, the refusal of the voters to extend the present railway franchise making that important to the bondholders.

Operating Income Lower on Boston & Maine Electrics

Operating income of the electric railways under the Boston & Maine Railroad supervision for the year ended Dec. 31, 1925, was $17,154, against $33,235 for a similar period ended the year previous. This fact was disclosed in the ninety-third annual report of the Boston & Maine. The electric properties included in the steam railroad system were the Portsmouth Electric Railway, operating from Portsmouth to Hampton, N. H., a distance of 14 miles, and the Concord Electric Railways, operating from Concord to Manchester and Penacook, N. H., a distance of 28 miles. The Portsmouth Electric Railway discontinued operation on May 17, 1925. The accompanying table shows the results of operation by these properties.

RESULTS OF OPERATIONS OF ELECTRIC RAILWAYS OF BOSTON & MAINE

	Year Ended Dec. 31, 1925	Year Ended Dec. 31, 1924
Revenues:		
Passenger	$202,535	$263,528
Freight	60	167
Mail	270	428
All other revenue	11,086	11,081
Total revenues	$213,951	$275,204
Operating Expenses:		
Total maintenance of way and structures	$25,635	$32,039
Total maintenance of equipment	$32,775	$47,945
Total power	$26,842	$37,042
Total traffic	$300	$489
Total transportation	$63,894	$83,315
Total general and miscellaneous	$21,994	$16,319
Total operating expenses	$171,443	$217,151
Net revenue	$42,507	$58,052
Tax accruals	25,353	24,817
Operating income	$17,154	$33,235

Doherty Interests Get Lake Shore Power

Ownership of the Lake Shore Power Company, carrying with it the control of the Toledo & Indiana Railroad, an interurban line between Toledo and Bryan, Ohio; the Toledo & Indiana Transportation Company, bus operating unit, and the Toledo & Indiana Building Company, owning the Toledo terminals of the electric line, has been purchased by Henry L. Doherty & Company.

It is anticipated that the power company will be linked up with the Toledo Edison Company, which serves territory both north and south of the Toledo & Indiana territory.

Future status of the railway is not yet determined. For the time being both units will continue to operate as at present.

Officers of the Lake Shore Power Company are Charles T. DeHore, president; Marion M. Miller, Toledo banker, treasurer, and LeRoy E. Eastman, secretary.

Officers of the Toledo & Indiana Railroad are L. G. Van Ness, Cincinnati, president; Charles T. DeHore, vice-president, and H. C. Warren, general manager.

President Van Ness and his associates also operate the Maumee Valley Transportation Company, a bus line which supplanted the former electric belt line operating on both sides of the Maumee River connecting Toledo with Maumee and Perrysburg, up-river suburbs.

Acquisition of the Toledo & Indiana line is the third electric railway purchase made by the Doherty interests here largely for development of the power distribution system in the Toledo territory. The Toledo & Western line and the Northwestern Ohio Railway were the two other railway properties whose power business was segregated and taken over by the Toledo Edison Company.

Change Proposed in Savannah Stock Set-Up

Stockholders of the Savannah Electric & Power Company, Savannah, Ga., which is part of the Engineers' Public Service System, a Stone & Webster, Inc., organization, will vote on Oct. 7 on a proposal to divide common stock on a four-to-one ratio and to place it on a no-par basis, and also to increase the authorized amount of first preferred or debenture stock.

It is proposed to change the present 25,000 shares of $100 par common stock into 100,000 shares of no-par stock and to give four new shares for every one of old held; to increase the number of common shares from 100,000 to 200,000; to increase from $1,800,000 to $2,300,000 the present amount of first preferred or debenture stocks, and to authorize directors to sell all or part of the new common or preferred stock.

Of the new common stock, 33,334 shares would be sold at $18 to Engineers' Public Service. The $600,000 provided by this sale would be used in part to complete an addition to generating equipment to cost about $2,300,000. Recently $1,700,000 of three-year 5 per cent coupon notes were sold to provide part of the amount required for this improvement.

The new preferred stock or debentures would be series C 7 per cent. It would be sold locally in lieu of 7½ per cent prior series debentures, which Savannah Electric has hitherto sold within its area of operations.

State Commission Reduces Illinois Rates $73,965,473 in Five Years

A total of $73,965,473 has been saved to the people of Illinois in reduced street car and elevated railroad fares and gas and electric rates in the five-year period from 1921 to 1926, during which Frank L. Smith has been chairman of the Illinois Commerce Commission. This statement was made by Mr. Smith himself to a committee composed of United States Senators in Chicago recently to investigate campaign fund expenditures.

Of the total saving, Mr. Smith declared, $43,223,473 was taken out of the earnings of Chicago traction properties; $35,281,326 of this was cut from Chicago Surface Lines revenues and the remainder from those of the Chicago Rapid Transit Company.

In answer to questions with regard to Rapid Transit rate reductions put to him by the investigating committee, Mr. Smith said:

> The rates were reduced about $8,000,000 in 1921. My recollection is that the fare was 10 cents at that time. The fare was lowered to three rides for 25 cents and a $1.25 book that reduced the average cost per passenger ride to 8⅓ cents.

$160,000 Net Income of Reading Company

The annual report of the Reading Transit Company, Reading, Pa., and its subsidiaries for the year ended July 31, 1926, shows a net income of $159,560, compared with $187,184 for the year previous. After deducting $119,145 for dividend on preferred stock, there was a balance of net income of $40,415 for the year 1926, compared with $68,039 for 1925. The company's complete statement follows:

EARNINGS OF READING TRANSIT AND SUBSIDIARY COMPANIES

	1926	1925
Operating revenue	$2,981,253	$3,018,159
Operating expenses and taxes	$1,715,145	$1,681,811
Maintenance and depreciation	700,990	750,186
Rentals	330,255	335,573
Total operating expenses maintenance, depreciation, taxes and rentals	$2,746,391	$2,767,570
Operating income	$234,861	$250,588
Other income	22,388	25,179
Total income	$257,250	$275,768
Deductions from Income:		
Interest on funded debt	$86,479	$77,459
Other deductions from income	11,210	11,124
Total deductions from income	$97,689	$88,583
Net income	$159,560	$187,184
Provision for dividend on preferred stock	119,145	119,145
Balance of net income	$40,415	$68,039

Record Travel on Chicago Surface Lines Continues

For the fourteenth consecutive month revenue rides on the Chicago Surface Lines, Chicago, Ill., exceeded the number of rides in the corresponding period of the previous year. The number of passengers carried in the month of July, while showing a slight decrease from the number recorded in June, increased 5,668,999 over a similar month of last year. The fact that the July figure is lower than that for June is attributed to the extraordinarily heavy traffic during the week of June 20, when in the three days of the Eucharistic Congress session in Chicago the system transported the largest number of people ever recorded by any single local transportation agency in the world. During the first seven months of this year there has been a total increase of 34,-

982,866 rides on the Surface Lines, which is approximately 10,000,000 more than the total increase of 1925 over the previous year.

Gross earnings for the month of July totaled $4,978,676, compared with $5,135,966 in June and $4,753,357 in the corresponding month of 1925. Divisible receipts of $310,841 allowed the company $139,878 for its 55 per cent interest in earnings. During the month the company paid $2,755,126 in wages, of which sum trainmen received $1,806,704. The average fare per ride, including free and transfer passengers, was 3.78 cents, as against 3.77 cents in July of 1925.

Annapolis Interurban Earnings Off

A net loss of $62,478 is reported by the Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md., for the six months ended June 30, compared with a net loss of $14,488 in the corresponding period of 1925. In June the net loss was $4,598, against $9,104 last year.

Gross railway operating revenue during the half year was $984,068, against $1,109,108 in the comparative 1925 period. Gross revenue for June was $168,757, compared with $182,485.

While the percentage of railway operating expenses to railway operating revenue in the six months was somewhat higher than in 1925, substantial reduction was shown in June in favor of the company. Operating ratio for the first half of the year was 82.13, against 80.17 per cent, in the 1925 period, but in June this was lowered to 79.50, against 83.40 per cent in June, 1925.

STATEMENT OF EARNINGS OF THE WASHINGTON, BALTIMORE & ANNAPOLIS RAILROAD

	Six Months	
	1926	1925
Railway operating revenues....	$984,068	$1,109,108
Railway operating expenses....	808,255	889,082
Net revenue railway operations.	$175,812	$220,026
Net revenue auxiliary operations	45,314	44,539
Net operating revenue.........	$221,127	$264,566
Taxes assignable to railway operations.....................	47,710	50,727
Operating income.............	$173,417	$213,839
Non-operating income.........	17,490	20,127
Gross income................	$190,907	$233,966
Deductions from gross income..	253,385	248,455
Net loss.....................	$62,478	$14,488
Percentage railway operating expenses to railway operating revenues..................	82.13%	80.17%

The earnings are exclusive of the income of such subsidiaries as the Annapolis & Chesapeake Bay Power Company, the Terminal Real Estate Company, and the Maryland Development & Realty Company of Anne Arundel County.

New Customer-Ownership Campaign in Portland

To meet heavy capital requirements for the next year or two, the Portland Electric Power Company, Portland, Ore., has decided to offer to the public a new issue of first preferred stock. The dividend rate is $6 per share per annum. This issue is cumulative as to dividends and is non-assessable. It is to be sold for $90 a share, cash or on easy terms. It will yield 6.67 per cent return, with the dividend payable quarterly, on the first day of March, June, September and December.

The primary purpose in making the offering is to obtain the personal, friendly interest of the people of Portland as shareholders and their help and advice toward making the public service institution a better and more efficient public servant in every way.

The company is withdrawing from the market its present 7.2 per cent first preferred stock, of which nearly $4,000,000, par value, has been purchased by employees, customers and the public in a little over two years.

In order to carry on its vast program, the company says it will need more than $3,000,000 of new capital each year for a number of years.

Dividend on Louisville Railway Common

At a meeting on Sept. 10, directors of the Louisville Railway, Louisville, Ky., ordered a disbursement of $2 a share on the common stock, payable on Oct. 1, to stockholders of record Sept. 15. This is the first common stock dividend since July, 1918. The directors also ordered payment of the regular semi-annual dividend of $2.50 a share on preferred stock, payable also on Oct. 1.

It was announced that the directors hoped to be able to put the common on a 4 per cent annual dividend basis, but before anything can be decided upon, results of the present new operating agreement will have to be determined.

Gross Income Increases.—The St. Paul City Railway, St. Paul, Minn., reports to the Department of Public Utilities an increase of $16,000 gross income for July, 1926, over July, 1925. For the first seven months, under the new rate of fare of 8 cents and six tokens for 40 cents, the gross for the first seven months of 1926 was $85,639 more than in 1925. The income to July 31 is equivalent to a net return of 4.25 per cent on a valuation of $16,200,000. Revenue passengers carried in July, 1926, totaled 4,866,087, against 5,378,570 in July, 1925, and 5,053,970 in June, 1926. Revenue passengers for the first seven months totaled 39,287,931, compared with 42,878,437 in 1925.

Railway Service Plea Approved.—The Public Service Commission has authorized the issuance of 13,685 shares of no par value stock by the Cumberland & Westernport Transit Company, successor to the Cumberland & Westernport Electric Railway, Cumberland, Md. The authorized capital stock is 3,930 shares of preferred of no par value and 9,755 shares of common of no par value. As soon as the recent sale under foreclosure is ratified by the court and the receivership terminated the new company will take hold. Authority to furnish electric railway service between Frostburg and Cumberland and between Frostburg and Westernport has been granted to the company following a hearing by the Public Service Commission.

One Through Line Discontinued.—Operation of through cars on the Westfield-Holyoke line of the Springfield Street Railway, Springfield, Mass., ceased on Sept. 7. The company is still giving local service on this line as far as St. Mary's Cemetery.

Decreased Earnings Due to Strike.—The effects of the strike of employees of the Indianapolis Street Railway, Indianapolis, Ind., are reflected in decreased earnings and increased operating expenses totaling $111,037, according to a report just filed with the Indiana Public Service Commission for the month of July. The strike continued from July 5 to July 31. The report shows the gross earnings of the month were $371,002, compared with $420,155 for a similar month of last year; operating expenses were $384,839, compared with $322,954 for July a year ago. This, the company said, was due to the additional expenses in operation and protection of the company's property during the strike period.

F. C. Marston Named for Brooklyn Board.—At a meeting of holders of the voting trust certificates of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., Fred C. Marston, secretary and treasurer, was nominated a director to succeed the late Charles Boody. The other eleven directors representing the voting trust certificate holders were renominated.

Bonds Refunded.—The $160,000 of 7 per cent bonds of the Marlborough & Westbury Street Railway due July 1, 1926, were paid off at maturity at the office of the American Trust Company, Boston, Mass. In connection with this payment the Worcester Consolidated Street Railway, Worcester, Mass., sold $160,000 of 6½ per cent refunding mortgage bonds dated Aug. 1, 1910, and due Aug. 1, 1930. The new securities were offered to the investing public through Harris, Forbes & Company, Boston, Mass.

Net Operating Revenues Fall Off.—During the calendar year 1925 the electric railways of the State of California had an operating revenue of $58,611,045, against $59,923,333 in 1924. This fact was disclosed in the annual report of the department of finance and accounts of the Railroad Commission. The operating expenses for 1925 were $47,062,373, against $46,181,326 in 1924. The net operating revenue in 1925 was $11,548,671, against $13,742,007 in 1924.

Revenue in Madison Increases.—While the total number of street car passengers carried by the Madison Railways, Madison, Wis., during August, 1926, showed a decrease compared with the 1920-24 four-year average for August the company's gross revenue from street car and bus operation increased $1,538 over that of August, 1925. Street car and bus passengers for August, 1926, totaled 441,703, compared with 407,744 for last year; street car passengers in August, 1926, 411,307, compared with 499,349 for the four-year average in August; gross street car and bus revenue in August, 1926, $30,251, compared with $28,713 for August, 1925; gross street car revenue August, 1926, $27,860, compared with $27,250 recorded for the corresponding month last year.

Wishes to Abandon Line.—The New York & Stamford Railway on Sept. 10 filed a petition with the Public Service Commission for permission to abandon "that portion of its route which is located on Palmer Avenue between Fenimore Road and Mamaroneck Avenue in the village of Mamaroneck, Westchester County." It was claimed that the route was no longer necessary for the successful operation of the road and the convenience of the public. A public hearing will be held on the application.

Increase in Net Earnings.—For the year ended Dec. 31, 1925, the gross earnings of the operating subsidiaries of the Electric Light & Power Corporation amounted to $44,614,878, against $41,452,378 in 1924. The net earnings were $18,417,861, against $16,425,549 in 1924. The Electric Light & Power Corporation owns considerable stock in many railway properties, including the New Orleans Public Service, Inc., New Orleans, La., and the Texas Interurban Railway, operating a high-speed service between Dallas and Terrell and Dallas and Denton.

Discontinuance of Line Approved.—Abandonment of the Northern States Power Company's unprofitable interurban line between Chippewa Falls and Eau Claire, Wis., which was postponed during Fair Week, was made permanent on Sept. 1, in accordance with an order of approval by the commission. Tracks will be removed in Chippewa Falls and out of Chippewa Falls as far as the city limits of Eau Claire. Electric railway service, however, will be provided by the company in Eau Claire.

Rental Dividend Declared by Interborough. — Directors of the Interborough Rapid Transit Company, New York, N. Y., on Sept. 14 authorized payment of the regular quarterly dividend rental of $1.25 per share on the stock of the Manhattan Railway subject to the plan of readjustment. The dividend rental is payable Oct. 1 to stockholders subject to the plan of readjustment of record Sept. 20.

Would Abandon Freight Stations.—Permission has been granted by the California Railroad Commission to the Pacific Electric Railway to discontinue and abandon its freight stations at Surf Street in the city of Santa Monica and at Mildred Avenue in Venice. The company has been authorized to establish in lieu thereof a consolidated freight station at Sunset Avenue, Venice.

Approves Removal of Trolley Route.—The Poughkeepsie & Wappingers Falls Railway, Poughkeepsie, N. Y., recently received formal approval from the Public Service Commission to substitute buses in place of street cars in Grand Avenue and South East Avenue in the city and town of Poughkeepsie. The city of Poughkeepsie through Mayor Frank B. Lovelace approved the application of the railway company so that the city could carry out a new paving program.

Apply to Abandon Lines.—The International Railway, Buffalo, N. Y., has petitioned the Public Service Commission for approval of a declaration of abandonment of certain lines in the village of Kenmore and the town and city of Tonawanda, Erie County. At the same time the International Bus Corporation, a subsidiary of the International Railway, filed a petition for a certificate of convenience and necessity for the operation of a bus route over substantially the route to be abandoned. Public hearing on these two applications will be held before the Public Service Commission.

New Grouping of Mississippi Properties.—Incorporation of the Mississippi Central Power Corporation in Maryland is said to presage the consolidation into a new group of several Southern public utilities supervised by the Electric Bond & Share Company. The properties said to be involved in the transaction are controlled by the Electric Power & Light Corporation, an Electric Bond & Share affiliation. The Electric Power & Light properties which it is expected will be re-grouped are the Arkansas Light & Power Company, Pine Bluff Company, Louisiana Power & Light Company, Central Louisiana Power Company, Louisiana Power Company and Mississippi Power & Light Company. These properties are already for the most part interconnected. They serve a population exceeding 300,000 persons.

Issues of Bonds, Notes and Stock Authorized.—The Minneapolis, Northfield & Southern Railway, Minneapolis, Minn., has been authorized by the Interstate Commerce Commission to issue $750,000 of first mortgage gold bonds, $250,000 of five-year convertible 6 per cent gold notes and $250,000 of common capital stock. Bonds are to be sold at not less than 55 per cent of par and the notes at not less than par.

Will Abandon Railway Service.—The New Bedford & Onset Street Railway, New Bedford, Mass., plans to discontinue service on all its electric lines after Oct. 16. Elton S. Wilde, president of the company, has sent notices to that effect to the Board of Selectmen in the several towns through which the road operates, namely Middleboro, Wareham, Rochester, Marion, Mattapoiset and Bourne. This action follows a recent vote of the board of directors, which was authorized by the stockholders some time ago to take whatever action it saw fit with the best interests of the company in mind. The line is 33 miles long. Just what will be done with the equipment, property and franchises of the railway has not been decided. The Union Street Railway is operating a bus line to take care of service in that section.

Petitions for Discontinuance. — The abandonment of 9 miles of track and right-of-way between Salamanca and Little Valley, N. Y., has been proposed to the Interstate Commerce Commission by the Olean, Bradford & Salamanca Railway, Olean, N. Y. In its petition for authority to discontinue service and take up the tracks on its Little Valley branch the railway states that the line was built in 1906 with the expectation of doing a large business between the two communities. Since then a concrete highway has been constructed between the two towns, paralleling the railway much of the way and private automobiles and buses now carry a large part of the traffic which the railway had expected. For some time the line has been a losing proposition and last year the loss equaled 50 per cent of the gross income, it is declared.

Personal Items

S. E. Mason Made General Manager at San Diego

The recent promotion of S. E. Mason as general manager of the San Diego Electric Railway and of the San Diego & Coronado Ferry Company, San Diego, Cal., marks another step in his rather meteoric career with these properties, owned and operated by the Spreckels interests. Mr. Mason entered the service of the San Diego companies as superintendent of equipment in July, 1923, coming from the San Antonio Gas & Electric Company, with which he was connected for eleven years, the last six as superintendent of equipment, traction department.

In January, 1924, he was promoted to the position of general superintendent, and in June, 1925, upon the resignation of Claus Spreckels, vice-president and general manager, who at that time gave up active management of the electric railway in order to devote more time to the general direction of the large diversified Spreckels activities in San Diego, Mr. Mason was appointed assistant general manager directly responsible to the president of the road. Reorganization and division responsibilities brought about by the death of John D. Spreckels led to his promotion to the position of general manager in August of this year. Mr. Mason was born in Texas in 1889.

Dean J. Locke Joins Baltimore Company

Dean J. Locke will join the staff of the United Railways & Electric Company, Baltimore, Md., on Oct. 1, as assistant superintendent of traffic. He will go from the Public Service group of transportation companies of New Jersey, where he has been staff engineer and personal assistant to the vice-president in charge of operation during the past four years.

Following his graduation from Worcester Polytechnic Institute in 1912, Mr. Locke entered the employ of Albert S. Richey, electric railway engineer of Worcester, Mass., as electrical engineer, and during a period of eleven years was actively engaged in the solution of a wide range of transportation problems for railway properties throughout the East. Included in his activities were traffic surveys, appraisals of railway and lighting properties, car and equipment tests, and statistical work. In

New Jersey Mr. Locke's work has been even broader, having to do with many of the activities of a large company operating city, suburban and interurban cars, city and suburban buses, and ferries, although the greater part of his time was devoted to the analysis and solution of problems arising from the active competition between motor vehicles and trolleys.

M. H. Aylesworth with New Broadcasting Company

M. H. Aylesworth, for many years managing director of the National Electric Light Association, has been elected president of the new National Broadcasting Company. He will perform the executive and administrative duties of the corporation.

Mr. Aylesworth, while not hitherto identified with the radio industry or broadcasting, has had public experience as chairman of the Colorado Public Utilities Commission, and, through his work with the association which represents the electrical industry, has a broad understanding of the technical problems which measure the pace of broadcasting.

One of his major responsibilities will be to see that the operations of the National Broadcasting Company reflect enlightened public opinion, which expresses itself so promptly the morning after any error of taste or judgment or departure from fair play.

The new company is really the outgrowth of the purchase of station W.E.A.F., by the Radio Corporation of America, which decided to incorporate that station, under the name of the National Broadcasting Company, Inc., to provide the best program available for broadcasting in the United States. It is hoped that arrangements may be made so that every event of national importance may be broadcast widely throughout the United States.

Obituary

C. A. Elliott

Clifford A. Elliott, cost engineer of the engineering department of the Pacific Electric Railway, Los Angeles, Cal., died on Sept. 6 at the Pacific Hospital. Mr. Elliott was one of the most widely known and highly regarded of veteran employees. Never of robust health, during the past two years he had been ill intermittently which caused him to give up his work from time to time.

Mr. Elliott became connected with the Pacific Electric in February, 1911, as a clerk. As cost engineer he had charge of computing expenditures and of preparing work orders. His familiarity with details of historical construction was one of his outstanding attributes. He was a regular contributor to the *Pacific Electric Magazine*, published by the railway, and for many years had been a contributor to the ELECTRIC RAILWAY JOURNAL.

Mr. Elliott was born in Missouri, in 1883.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

400,000 Tons of Steel Needed

New York City Will Want This Amount in Two Years, but Is Against Bids from Abroad

New York City within the next two years will require 400,000 tons of steel for its subway building program. To date, about 7,500 tons of steel has been contracted for on the subway construction sections now under way. On one of the subway contracts now under construction the Board of Transportation, in the hope of reducing costs, segregated the steel items from all the other items and asked for independent bids from steel manufacturers in this country. Despite this, only three bids were received from steel fabricators, and one of the leading steel mills that supplies most of the steel to subway builders did not bid at all.

The most recent subway construction contract awarded by the Board of Transportation contained an item for 3,000 tons of steel at $115 a ton. The average price, however, varies between $120 and $125 a ton.

Despite the urgings of contractors, the board has declined to approve of the use of foreign fabricated steel for the subways now under construction. Contractors have asked that German and Belgian made steel be utilized in the construction of the new rapid transit system, but the board is determined to adhere to its policy of using only American made steel, unless unit item prices for home-made articles are increased to a point where foreign competition must have to be considered as a matter of self-protection against unwarrantably high bids for domestic products.

The board does not wish unnecessarily to invite the foreign made steel here. Moreover, expert inspection of the foreign made material would necessitate the employment and maintenance of steel inspectors in the foreign mills. This objection is not so serious, however, for contractors have offered to defray the added expenses of foreign inspection and maintenance of American inspectors at the mills abroad.

Handbook of Pneumatic Tools for Railways

A convenient little pocket handbook of pneumatic tools for railways has just been published by the Ingersoll-Rand Company, New York, N. Y. While many of the tools listed therein are particularly designed for steam railroad uses, there are also many which are equally applicable for use in electric railway shops. The major portion of the handbook is given over to pictures of Ingersoll-Rand tools in actual use in various applications, and in each case the recommended size and type of tool for that particular task is given. Electric railway men will be particularly interested in the tools specified for repair work on steel cars, wood work on composite cars and wooden cars, and tools for passenger car work. Descriptions of Ingersoll-Rand pneumatic tools of all types suitable for railway work are also included in this compact handbook.

Sales of Yellow Coaches to Electric Railways Are Active

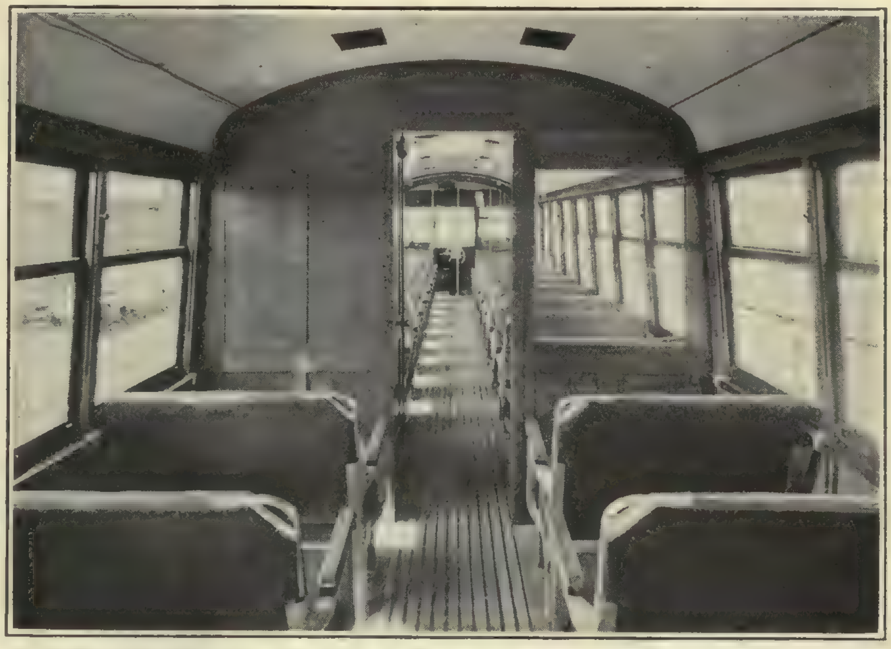
During the month of August a large number of buses manufactured by the Yellow Truck & Coach Manufacturing Company, of Chicago, Ill., were sold to electric railway companies and their bus-operating subsidiaries throughout the country. Three 21-passenger, pay-enter coaches were also ordered by the London Street Railway Company, London, Ont.

The purchasers and the types and numbers of units ordered by each are reported as follows:

Operator	Model	No. Units
Houston Electric Company, Houston, Tex.	"X" 21-passenger, pay-enter	1
	"Z" 230-wheelbase 33-passenger coach	1
London Street Railway, London, Ont., Canada	"X" 21-passenger, pay-enter	3
Potomac Edison Company, Hagerstown, Md.	"X" 21-passenger, pay-enter	2
Fort Dodge, Des Moines & Southern Transportation Company, Boone, Iowa	"Y" Parlor Coach, 29-passenger	2
Blue Goose Motor Coach Company, East St. Louis, Ill.	"Y" Parlor Coach 29-passenger	1
Tennessee Electric Power Company, Nashville, Tenn.	"Z" 29-passenger, City service	10
New Orleans Public Service Company, New Orleans, La.	Gas-electric chassis (St. Louis bodies)	9
Boston Elevated Railway, Boston, Mass.	"Z" 29-passenger, City service	5
Tri-City Railway, Davenport, Iowa	"X" 21-passenger pay-enter	6
West Pennsylvania Railway, Pittsburgh, Pa.	"X" 21-passenger pay-enter	2
International Bus Corporation, Buffalo, N. Y.	Gas-electric 33-passenger, City service	5
Wyoming Valley Autobus Company, Wilkes-Barre, Pa.	"X" 21-passenger, pay-enter	2
	"Z" 29-passenger, City service	10

Important Notice to Exhibitors at Cleveland Convention

EXHIBITS at the American Electric Railway Association convention in Cleveland will be thrown open to the general public on Wednesday evening, Oct. 6, from 7 to 10:30 o'clock. It is expected, therefore, that each exhibitor will have some one in attendance at his booth between these hours. This will not only safeguard exhibits from molestation or possible theft, but will further pleasant relations with the public through having competent representatives on hand to answer questions. Exhibitors owe it to themselves to have their booths properly manned on Wednesday evening.



Looking Forward from the Smoking Compartment in One of the New Alliance Cars

Another Snag in Purchase of Seattle's 80 New Cars

Discussion over the purchase of extensive new rolling stock by the Municipal Railway waxes quite warm at times in official circles of Seattle, Wash. The City Council has attempted to justify the proposed purchase of 80 street cars with the statement that they are needed to accommodate the steady increase in patronage on the city's lines. Official reports have been forthcoming, however, to show that the number of car riders has done anything but increase of late. A legal obstacle to the issuance of bonds to finance the purchase has thus suggested itself to Corporation Counsel T. J. L. Kennedy.

He had been asked by City Comptroller Harry W. Carroll to pass on the ordinance providing for the purchase, the Comptroller meanwhile withholding the sale of $1,875,000 bonds. While leaving the finding of fact up to the Council, Mr. Kennedy held that it is without authority to issue bonds for the purchase of any new utility equipment intended as replacement. Such an act would be in violation of a section of the state law designed to safeguard the public from mismanagement of a municipally owned utility, Mr. Kenney pointed out.

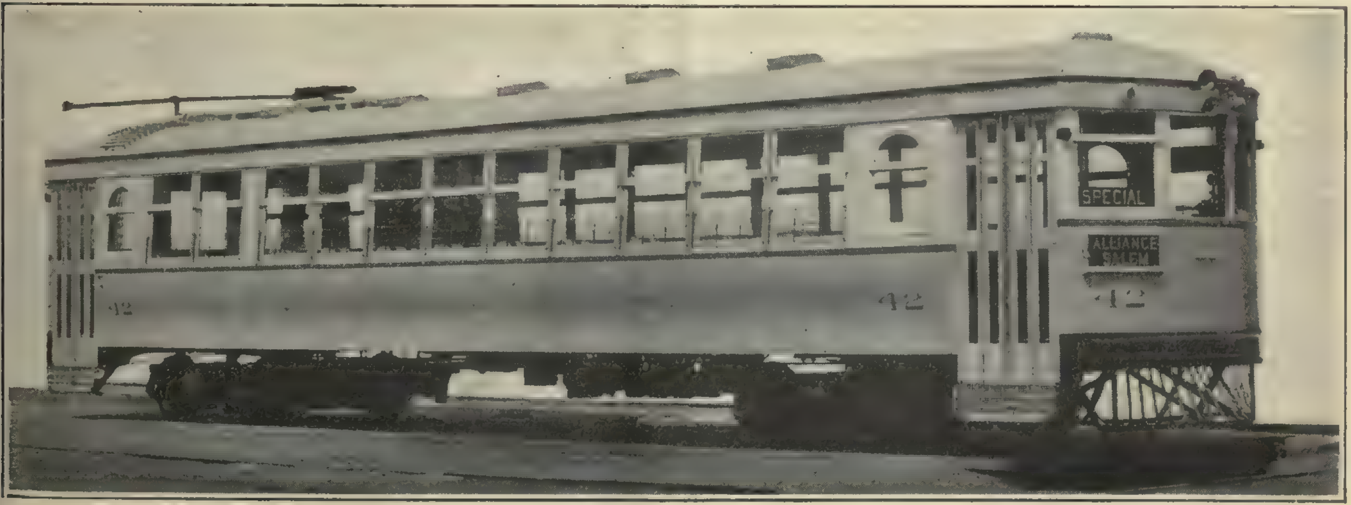
Whether the present contemplated purchase was for the purpose of extension or for replacement, the Corporation Counsel indicated, was for the Council itself to determine. This point has already been discussed at length among Council members. At the time the ordinance was being framed Councilman Oliver T. Erickson pointed out the "deceit" in the bill, which declares that the present rolling stock is "entirely inadequate to provide properly for transportation of the passengers now using the said system, and the increase in the number of patrons of said system has accentuated the already urgent demand for seats for all passengers." In view of all railway department reports showing a steady decrease in patronage, the falsity of such a statement is evident, according to Mr. Erickson. He points out, therefore, that any new equipment must be considered replacement.

Commenting on the opinion of the Corporation Counsel, City Comptroller Carroll said that he will continue to hold up the issuance of the bonds until he can determine whether there is any concealed discount in the purchase contract and also whether the new cars are in the nature of extension or replacement.

Passenger Comfort Is Greatest Factor in New Alliance Cars

Many special features have been incorporated into the design of the new cars delivered to the Stark Electric Railroad, Alliance, Ohio, to render them attractive to the riding public. Intended for interurban service, the eight new units combine both passenger and smoking compartments and each is further equipped with a toilet room, located at the partition between the passenger and smoking compartments. It is planned to operate the cars under one-man operation, full use being made of safety devices which will render that control absolutely safe.

Specifications on the cars were published in the issue of ELECTRIC RAILWAY JOURNAL for April 17, 1926. The new rolling stock was built by the Cincinnati Car Company, Cincinnati, Ohio, and is to be used in service between Alliance and Salem. Such un-



Eight of These Cars Have Been Placed in Service Between Alliance and Salem, Ohio usual features as hat check boxes and telephones are included in the equipment.

Westinghouse Engineering Department Reorganized

A reorganization of the general engineering department of the Westinghouse Electric & Manufacturing Company has been announced by H. W. Cope, assistant director of engineering. The reorganization has necessitated the reallocation of several engineers, four being elevated to managers of engineering. These are S. B. Cooper, manager of railway engineering; F. C. Hanker, manager of central station engineering; G. E. Stoltz, manager of industrial engineering, and W. E. Thau, manager of marine engineering.

Other appointments announced by Mr. Cope are:

Railway Engineering—H. K. Smith, engineer heavy traction engineering; G. M. Woods, engineer light traction engineering, and A. H. Candee, engineer gas-electric traction engineering.

Central Station Engineering—C. A. Powel, engineer generating station engineering; R. D. Evans, engineer transmission engineering, and C. A. Butcher, engineer substation engineering.

Industrial Engineering—C. W. Drake, engineer general industrial engineering; J. W. Speer, engineer material handling engineering, and E. B. Dawson, engineer electrochemical and electrometallurgical engineering.

The appointment of N. W. Storer as consulting railway engineer in charge of the group handling of Diesel-electric locomotives and rail cars, has been announced by R. S. Feicht, director of engineering.

Track and Line

Community Traction Company, Toledo, Ohio, has ordered 750 tons of 100-lb. rail to be used in the reconstruction of the Cherry Street line and a section of Nebraska Avenue. Track construction will be of the steel-tie type. The actual work will await the plans of the city of Toledo for its repaving of the two streets.

Seattle Municipal Railway, Seattle, Wash., has awarded contracts totaling $9,625 for cable on the Yesler Way, James Street and Madison Street lines.

Los Angeles Railway, Los Angeles, Cal., has filed an application for permission to extend the street car tracks from Fifth and Flower Streets west to the intersection with Beaudry Avenue, thence across Beaudry Avenue and Boylston Street to connect with the present Sixth Street line; also to extend the car line on Figueroa Street from Fifth Street to Sixth Street. A more direct connection with the downtown district will be made by the extensions requested and will be of great benefit to patrons using these car lines.

Winnipeg Electric Company, Winnipeg, Man., is building an extension of line on St. Ann's Road, from St. Mary's Road, 8,000 ft. of single track open construction to be laid with 60-lb. rails and provided with bracket arm trolleys. The company contemplates building a double-track line on the new Memorial Boulevard, connecting Portage Avenue and Broadway; 2,200 ft. of track to be laid on Main Street with 85-lb. C.P.R. rails with elastic fillers provided with span wire trolley on ornamental lighting posts. It will also relay 1,200 ft. of double track line on Osborne Street from Broadway to Osborne Bridge, construction to be similar to that on Memorial Boulevard. This relaying has been rendered necessary owing to the realignment of Osborne Street.

South Carolina Gas & Electric Company, Spartanburg, S. C., has received much of the material to be used in relaying its rails on West Main Street. The company is reported ready to start installation just as soon as the Southern Paving & Construction Company, holder of the local paving contract, is ready to pave the thoroughfare. This company will lay the rails as well as do the paving.

San Diego Railway, San Diego, Cal., has started the reconstruction of track on the Imperial Avenue line. The standard steel tie and concrete ballast type of construction will be used. Additional crossovers are being installed to permit through line traffic. The work will cost about $75,000.

ELECTRIC RAILWAY MATERIAL PRICES—Sept. 14, 1926

Metals—New York

Copper, electrolytic, cents per lb.	14.35
Lead, cents per lb.	8.75
Nickel, cents per lb.	35.00
Zinc, cents per lb.	7.45
Tin, Straits, cents per lb.	68.875
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	56.00
General service	31.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$5.375
Somerset mine run, Boston	1.95
Pittsburgh mine run, Pittsburgh	2.00
Franklin, Ill., screenings, Chicago	1.575
Central, Ill., screenings, Chicago	1.40
Kansas screenings, Kansas City	2.35

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.30
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.20
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.65
Sheet iron (24 gage), cents per lb.	3.00
Sheet iron, galvanized (24 gage), cents per lb.	3.85
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	12–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–17.50
Colored	10–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	11.6
White lead in oil (100 lb. keg), cents per lb.	15.25
Turpentine (bbl. lots), per gal.	$0.95
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	5.25–5.50

* Prices f.o.b. works, boxing charges extra.

Wire—New York

Copper wire, cents per lb.	16.25
Rubber-covered wire, No. 14, per 1,000 ft.	$6.00
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$147
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4 N.Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.10
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.75
Light copper, cents per lb.	10.00
Heavy brass, cents per lb.	7.125
Zinc, old scrap, cents per lb.	4.25
Lead, cents per lb. (heavy)	7.25
Steel car axles, Chicago, net ton	$17.75
Cast iron car wheels, Chicago, gross ton	15.50
Rails (short), Chicago, gross ton	17.75
Rails, (relaying), Chicago, gross ton	26.00
Machine turnings, Chicago, gross ton	8.25

Power Houses, Shops and Buildings

Indianapolis Street Railway, Indianapolis, Ind., plans the construction of five substations, bids on which are being received. Each station will cost about $20,000 and will be 32 ft. x 50 ft. Each will be of brick with steel sash, and equipped with fire doors. Construction will start this fall in an effort to have the substations in operation before midwinter.

Trade Notes

E. H. Johnson has been appointed engineer of the service department for the Timken Roller Bearing Company, Canton, Ohio. He will have direct charge of the installation of Timken bearings in automotive and industrial applications. Mr. Johnson's experience in this field with the Timken company qualifies him particularly well to direct this work.

Ingot Iron Railway Products Company, Middletown, Ohio, announces the removal of its general office from 122 South Michigan Avenue, Chicago, Ill., to Middletown, Ohio. District offices are maintained at Chicago, St. Louis, Minneapolis and Philadelphia.

New Advertising Literature

General Electric Company, Schenectady, N. Y., has issued bulletin GEA-452 describing its welding head and accessories for automatic arc welding.

Lincoln Electric Company, Cleveland, Ohio, has started the publication of a house organ known as "The Operator's Stabilizer," published "for operators who take pride in their jobs." A. F. Davis, the editor, wants to make the stabilizer a regular and frequent "convention" of the boys doing the real work in welding. The first issue devoted generous space to "How Can I Do It?" as well as "How I Did It." Suggestions are invited.

Net Revenue Can Be Increased!

—by reducing accident claims and reserves due to and necessitated by failures of inferior handbrakes in emergencies or during power interruptions. In modernizing equipment safety should be considered as an all important factor.

The Peacock Staffless

Peacock Staffless Brakes

are like an insurance policy protecting against inroads upon net revenue and accident reserves due to failure of hand brakes.

Low installation and maintenance costs; simplicity of operation; minimum platform space; thoroughly modern in every particular; developing three times the braking capacity of ordinary handbrakes; 144-in. chain winding capacity insuring adequate braking power even though brake shoes are worn and brake rigging is loose. There are other factors that adapt Peacock Staffless Brakes to the most modern cars.

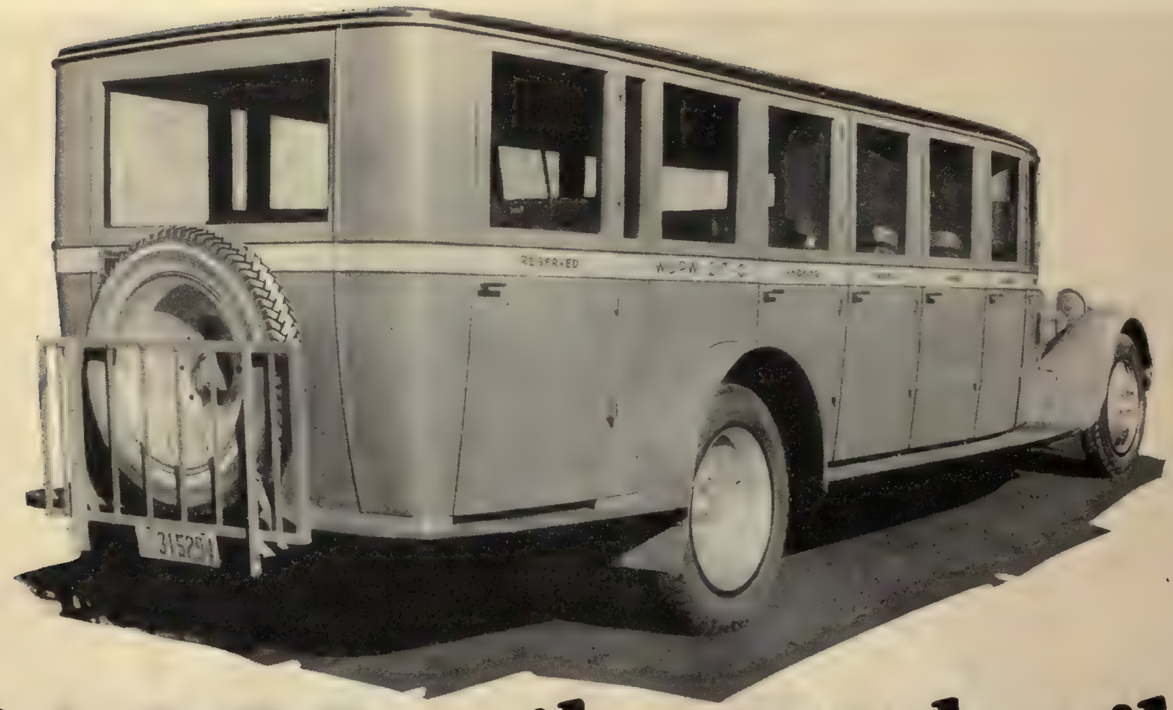
Further facts, figures and estimates upon request.

NATIONAL BRAKE CO., Inc., 890 Ellicott Sq., Buffalo, N.Y.

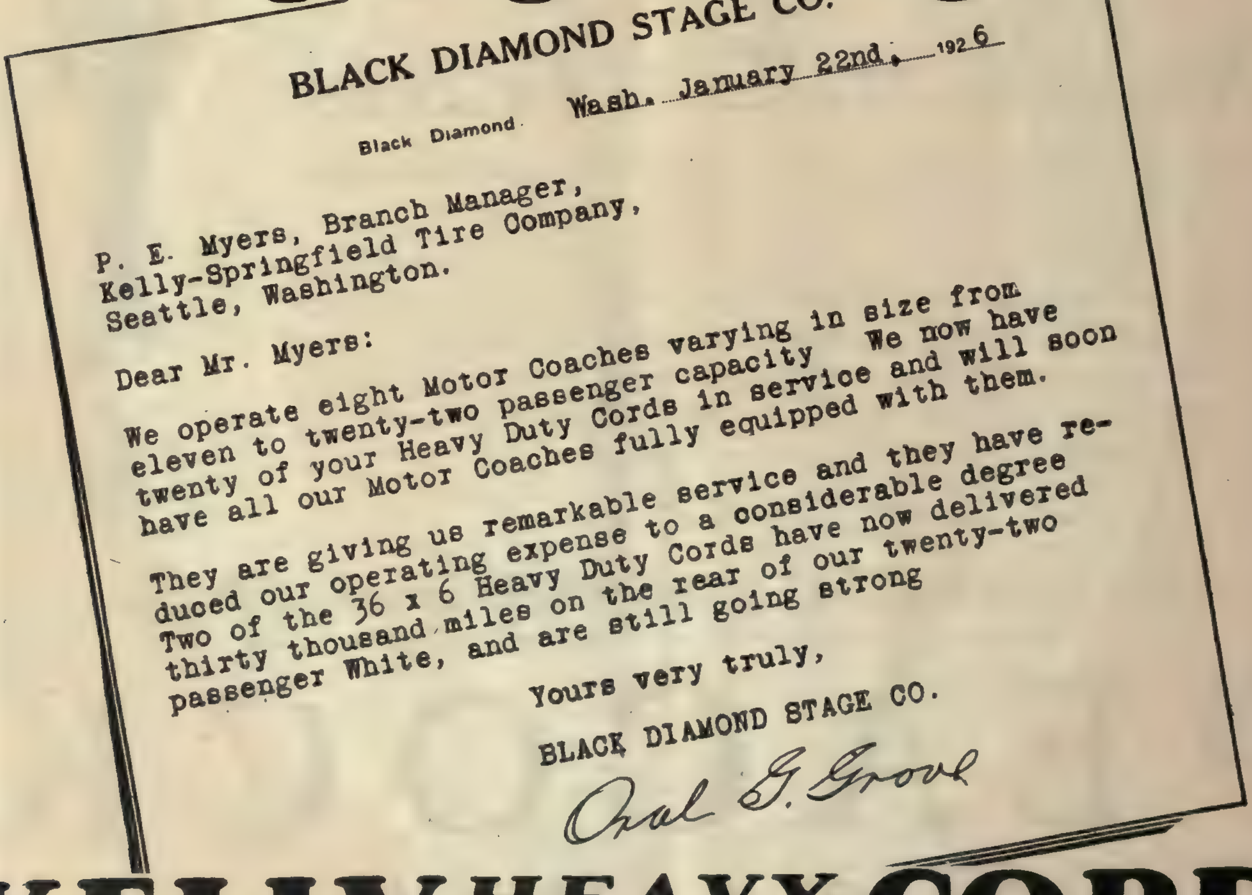
***Canadian Representative:* Lyman Tube & Supply Co., Limited, Montreal, Canada**

PEACOCK

Staffles Brakes



30,000 miles and still going strong



BLACK DIAMOND STAGE CO.

Black Diamond Wash. January 22nd, 1926

P. E. Myers, Branch Manager,
Kelly-Springfield Tire Company,
Seattle, Washington.

Dear Mr. Myers:

We operate eight Motor Coaches varying in size from eleven to twenty-two passenger capacity. We now have twenty of your Heavy Duty Cords in service and will soon have all our Motor Coaches fully equipped with them.

They are giving us remarkable service and they have reduced our operating expense to a considerable degree. Two of the 36 x 6 Heavy Duty Cords have now delivered thirty thousand miles on the rear of our twenty-two passenger White, and are still going strong.

Yours very truly,

BLACK DIAMOND STAGE CO.

Oral G. Grove

KELLY HEAVY DUTY CORD

Mack

6 Bus

Mack designed it
Mack built it
Mack stands behind it

Mack Trucks Inc.

International Motor Company
25 Broadway New York City

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

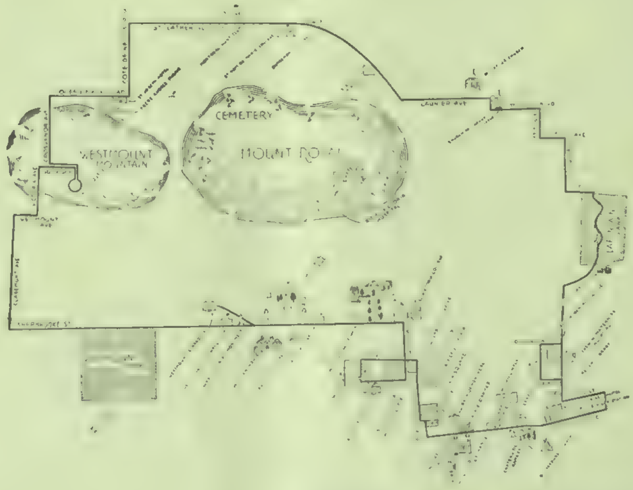
Seeing Montreal in

YELLOW KNIGHT

YELLOW COACHES

CITY TOURS
8
YELLOW SIGHTSEEING TOURS

50


CEMETERY
WESTMOUNT MOUNTAIN
MOUNT ROYAL
LAURIER AVE
SHERBROOKE ST

A2865-M

CENTS net profit per mile

Yellow Coaches are making money for the Yellow Cab Company in Montreal, Canada—making it at the rate of 50 cents net profit per mile.

Cost of operation is spread over the entire year with revenues accruing only during a short operating season. This makes more remarkable the showing in net earnings per mile.

Historic Montreal is the furthest point north on this continent where motor coach sightseeing operations are conducted, and from May until October ten Yellow Sightseeing Coaches are kept busy—*Yellow Coaches exclusively*—carrying tourists over the city sightseeing route of 16 miles. Each coach averages four trips daily in clear weather, and on week ends special extended tours are conducted which circle the western part of the island of Montreal, a distance of 56 miles.

Last year, Yellow Coaches carried 43,373 passengers and piled up a total of 28,465 miles—a good record for a short season.

ON ACCOUNT OF

Form BRD 14

JOS. M. SHEA TOURIST CO., INC., Boston, Mass.
Tours . Advice Coupon

To be presented to

Rate

Form 2-T
No. 5868

PECK-JUDAH TOURS
ADVICE STUB

M

THIS COUPON WILL BE HONORED BY

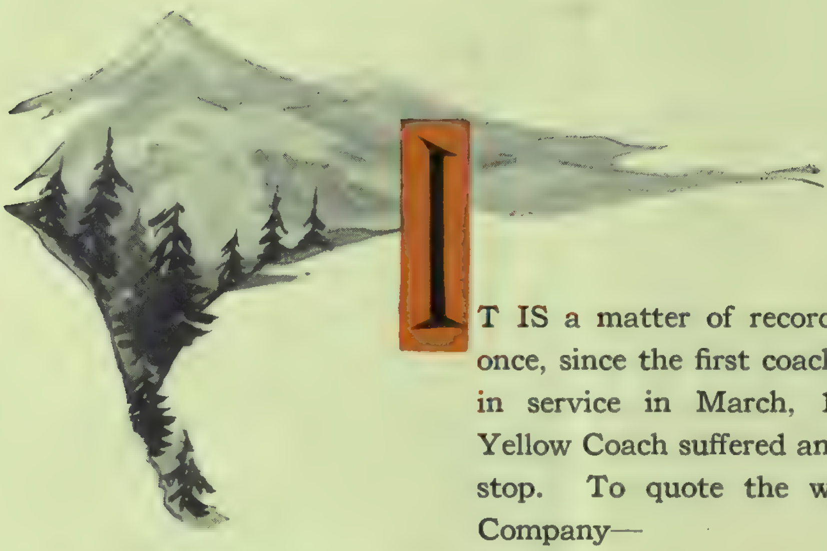
FOR

TOTAL AMOUNT COLLECTED, $

PARTY TO ARRIVE

S 3169

Please honor, and attach lifted order to bill against us for amount due.
THE PECK JUDAH CO., Inc.



IT IS a matter of record that never once, since the first coach was placed in service in March, 1924, has a Yellow Coach suffered an involuntary stop. To quote the words of the Company—

"Once the season starts, Yellow Coaches keep going."

And the "going" is by no means easy, for road conditions are far from ideal. Steep grades are encountered and the severity of the stiff Canadian winters leaves its marks on the highways.

This season, so great is the operating company's confidence in their equipment that the plan will be tried of keeping six Yellow Parlor Coaches on the road for sightseeing during the winter. That stamina of performance will carry them through the heavy snows is a prediction which influences this extension of service so as to yield profitable revenue *every month in the year.*

Whatever type of operation *you* contemplate, Yellow Coach plus General Motors stands ready to guide you in the selection of your routes, the establishment of fixed profits and to protect your investment with financial stability that eliminates all danger of orphan equipment.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

Why use good ideas in car construction only for new cars?

HASKELITE

MORE than 85% of the electric railway cars in service are over five years old. While some of these can profitably be scrapped to make way for modern cars, many will have to stay in service for years to come. Some such cars are coming up for major overhauling every year. Why not use the same modern ideas in reconditioning these cars that are proving so successful in new designs?

For example, PLYMETL side panels and HASKELITE roofs, floors, interior side lining, etc., have demonstrated to scores of leading railway companies that the weight of the car can be cut 500 to 900 lbs. while its strengh, its resistance to accident, and its appearance are actually improved. Is operating economy any less desirable on rebuilt cars than on new ones?

If you have not yet had personal experience with the merits of this waterproof plywood for car or bus construction, you can put it to the test on your own equipment at a very moderate cost by specifying HASKELITE and PLYMETL on your next reconstruction job. We know that if you once learn the ease with which this material is applied, its wearing quality, the simplicity of emergency repairs, the beauty of its finish and the economy resulting from its use, you will join the large and ever growing army of its staunch supporters.

Blue print booklets showing applications of HASKELITE and PLYMETL to street car and bus construction will be sent on request.

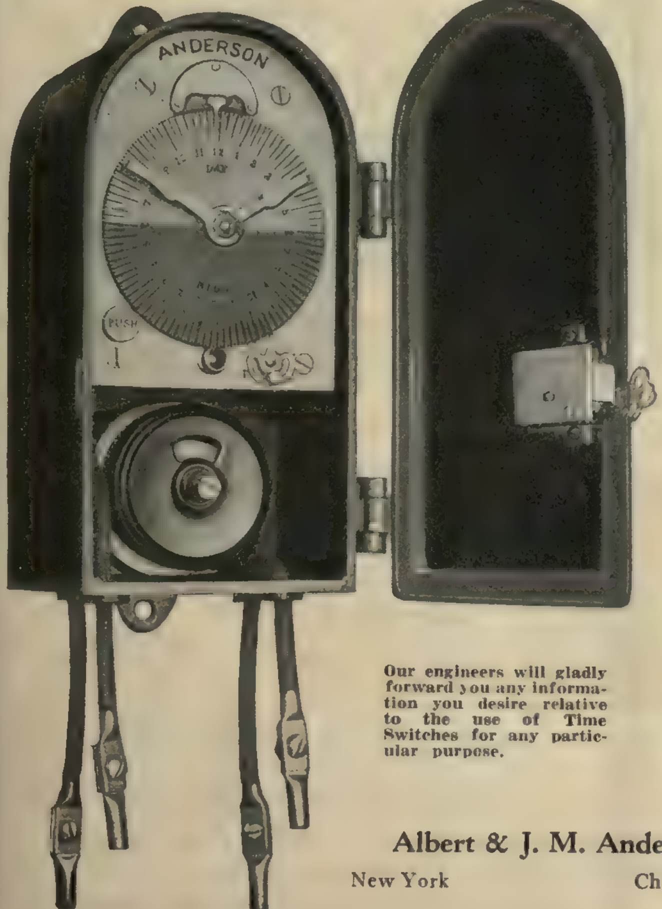
PLYMETL

HASKELITE MANUFACTURING CORPORATION
133 W. Washington Street
CHICAGO, ILLINOIS

Canadian Representatives:
Railway and Power Engineering Corp., Ltd.
Montreal, Toronto, Winnipeg

The Milwaukee Electric Railway & Light Co. and many others order these products for reconstruction work.

ERJ9-18 Gray



Our engineers will gladly forward you any information you desire relative to the use of Time Switches for any particular purpose.

Many uses for Time Switches

This handy Time Switch will automatically turn an electrical circuit on and off at the predetermined times at which it is set. You can use it for electric signs, illuminated billboards, street lighting, automatic substations, heating circuits, circuit breaker operation and many other applications where a circuit must be opened and closed or closed and opened at definite periods.

But be sure it is an Anderson you install if you want positive, unfailing operation.

Every part of this dependable Time Switch including the clock, which is the heart of a Time Switch, is built under the same roof.

Many Andersons have been in constant operation, except for an occasional cleaning, for over eighteen years and are still giving satisfactory service, because they were designed then as they are today for absolute dependability.

Send for Bulletin No. 37

Albert & J. M. Anderson Mfg. Co., 289-305 A St., Boston, Mass.

New York Chicago Philadelphia London

The TAPERED SLEEVE Insures absolute contact.

The Principle that established solderless connectors as good engineering.

The more contact surface you get in a connection—the better the joint.

Because the tapered sleeve of the Dossert Connector gave engineers a means for securing large contact area held permanently tight—the solderless connector idea met with favor.

Today it is standard practice.

Write for the Dossert Catalog.

Dossert & Company, New York
242 West 41st Street
H. B. LOGAN, President

DOSSERT
Solderless Connectors

Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

You're having brush trouble

CORRECT IT
USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

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PERFECT MICANITE INSULATOR REG. U.S. PAT. OFF. and PERFECT EMPIRE INSULATOR REG. U.S. PAT. OFF.

Micanite Sheets for all purposes

Micanite Commutator Segments

Micanite Commutator Rings

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias
(*Yellow or Black Varnished Tapes*)

Empire Oiled Cloths and Papers
(*Yellow or Black*)

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Write for Catalogs and helpful booklet on Commutator Insulation and Assembly

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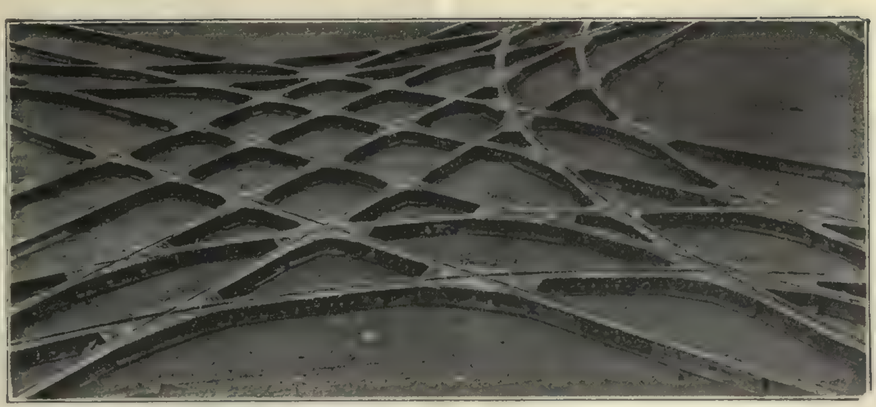


THE STANDARD IN TRACKWORK FOR NEARLY FIFTY YEARS

BUDA
ESTABLISHED
1881

*Send us
your
Inquiries*

THE BUDA CO. HARVEY, ILL.

H-B LIFE GUARDS

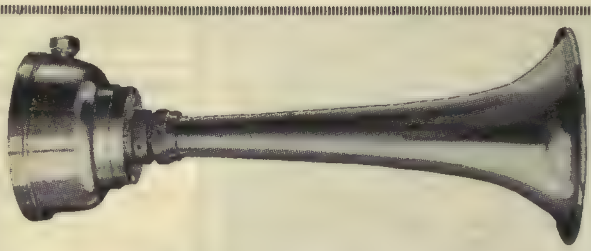
Have been adopted almost universally as part of the safety equipment of all street cars.
EFFICIENT—because they are designed right.
DURABLE—because they are made right.
ECONOMICAL—because maintenance is low

*Do not accept an imitation
Insist upon the original*

H-B LIFE GUARDS

Manufactured by

The Consolidated Car Fender Company
Providence, R. I.
Wendell & MacDuffie Co., General Sales Agents
110 East 42nd St., New York, N. Y.



Strombos Signals for Railway Service

A pleasing sound of tremendous volume is emitted from the powerful Strombos Signal which is admirably suited for railway service. Day in, day out, it broadcasts a warning of approaching danger and promotes safe and efficient railway operation.

The Strombos Signal operates on an air pressure of 10 lbs. and over and is controlled by a lever valve and cord. It uses only 1/10 the volume of air required by a whistle. It has no moving parts which might fail in the emergency.

Write us for more complete data.

AMERICAN STROMBOS CO.
INCORPORATED
18th & Market Sts., Philadelphia, Pa.

Clark-Williams Tubular Iron Pole Reinforcing and Extension Clamps

Years can be added to the life of any iron pole which has become corroded at the ground level with our REINFORCING CLAMPS, or added height may be obtained by using the EXTENSION CLAMPS.

ALSO MOUNTS FOR WOOD POLES.

Ask for quotations on your requirements.

The Clark-Williams Engr. Co.
886 Main St., Bridgeport, Conn.
Represented in Canada by the Canadian Line Materials, Ltd., Toronto, Ont.

Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000 Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

Hemingray Glass Company
Muncie, Ind.
Est. 1848—Inc. 1870

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

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Roofing—Headlining—Wainscoting

The only homogeneous panel board

standard
for electric railway cars
and motor buses

The PANTASOTE COMPANY Inc.
At 46th Street 250 Park Avenue
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Pantasote Products for Both ELECTRIC RAILWAYS AND BUSES

This Paper is a "Member *of the* A.B.P."

To you, this is a fact of especial significance, for it means that this publication is part of a concerted movement to raise the level of publishing practice, to assure better service to both subscribers and advertisers.

The "A.B.P." is built upon and revolves around the following set of standards —

STANDARDS *of* PRACTICE

THE publisher of a business paper should dedicate his best efforts to the cause of Business and Social Service, and to this end should pledge himself—

1. To consider, first, the interests of the subscriber.
2. To subscribe to and work for truth and honesty in all departments.
3. To eliminate, in so far as possible, his personal opinions from his news columns, but to be a leader of thought in his editorial columns, and to make his criticisms constructive.
4. To refuse to publish "puffs," free reading notices or paid "write-ups"; to keep his reading columns independent of advertising considerations, and to measure all news by this standard: "Is it real news?"
5. To decline any advertisement which has a tendency to mislead or which does not conform to business integrity.
6. To solicit subscriptions and advertising solely upon the merits of the publication.
7. To supply advertisers with full information regarding character and extent of circulation statements, subjects to proper and authentic verification.
8. To co-operate with all organizations and individuals engaged in creative advertising work.
9. To avoid unfair competition.
10. To determine what is the highest and largest function of the field which he serves, and then to strive in every legitimate way to promote that function.

Publications which have subscribed to these standards have earned the preferred consideration accorded them.

THE ASSOCIATED
BUSINESS PAPERS, INC.
220 West 42nd Street, New York

Change a wheel? Change a harp?
Change a pole?

Easy!
BAYONET TROLLEY HARP CO.

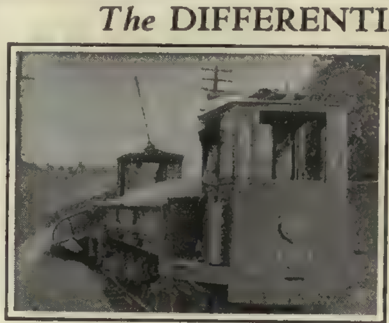
Easy as slipping a tool
in a drill chuck!

Bayonet Trolley Harps are made with a quick-detachable feature which permits a change of harp and wheel in 10 seconds. In 30 seconds, with the detachable pole clamp, you can change an entire trolley. Standardize on Bayonet equipment for maximum economy and efficiency.

Bayonet Detachable
Trolley Equipment

BAYONET TROLLEY HARP CO., Springfield, O.

The DIFFERENTIAL CAR



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60 Railways for

Track Maintenance
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Hauling Cross Ties
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Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

TULC
A
LUBRICANT

We make a specialty of
ELECTRIC RAILWAY
LUBRICATION
We solicit a test of TULC
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Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

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Electrically Welded Joints

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Sales Offices:
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Wharton Special Trackwork

Trackwork of superior quality, incorporating the famous Tisco Manganese Steel.

WM. WHARTON JR. & CO., Inc.
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HIGH SPEED TOOL STEEL

Being the pioneers in this grade of steel we have a grade that will best meet your requirements.

Send for our book on High Speed Steel.

Est. LUDLUM 1854

LUDLUM SPECIAL STEELS LUDLUM STEEL COMPANY
STEELS SPECIAL PURPOSES WATERVLIET-N.Y.-U.S.A.

Everything a 6 should have *plus* Mack reputation --

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Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
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Operating Problems Rates Traffic Surveys
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Transmission Line and Special Crossing Structures, Catenary Bridges

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Engineers and Contractors SYRACUSE, N. Y.

THE P. EDWARD WISH SERVICE

50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

The Most Successful Men in the Electric Railway

Industry read the

ELECTRIC RAILWAY JOURNAL

Every Week

Adapted to all Types of rails and paving.

GODWIN

Steel Paving Guards

Proven by service to economically prevent seepage and disintegration of street railway paving.

Write for Illustrated Catalog No. 20

W. S. GODWIN CO., Inc.

Race and McComas St., Baltimore, Md.

"Axle Specialist Since 1866"

Address all Mail to Post Office Box 515, Richmond, Va.

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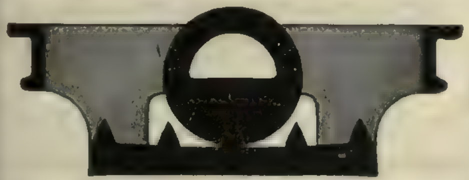
J. R. JOHNSON AND CO., INC.

FORGED STEEL AXLES

For Locomotives, Passenger, Freight and Electric Cars

Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

ACME Window Curtain Fixtures

Noiseless — direct acting — enlarged friction surface — less parts — stronger — more easily and finely adjusted.

MORTON MANUFACTURING COMPANY

Chicago

UNA

RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio

Nuttall

NUTTALL

Tapered Roller Bearing Trolley Base

Type US No. 20A

Here is the latest Nuttall Trolley Base incorporating the famous Timken Roller Bearing — a tapered double-race roller bearing which has been designed by this manufacturer especially for trolley base service.

Particularly interesting features of this new base include extreme sensitiveness, with swiveling strains evenly distributed on bearings; oil and grease reservoirs for lubrication of bearings and pole socket axle pin respectively; quick, easy lubrication only once in six months.

Full specifications on request

MEMBER AERA 1926

R.D.NUTTALL COMPANY

PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

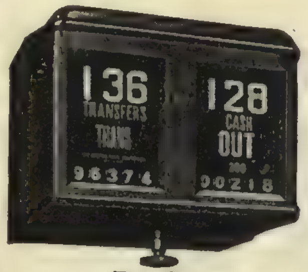
FARE
BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGES CARRIERS Tokens

Hubbard and COMPANY
PITTSBURGH · OAKLAND, CAL. · CHICAGO



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.

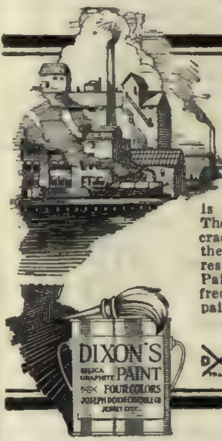
THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

Triple Mileage with THORNTON
Side Bearing
Trolley Wheels

J. F. Schmidlapp, M. M., Ohio Valley Electric Railway Company, Huntington, W. Va., writes,

"We have been using the THORNTON trolley wheel and nothing else for more than a year, and in checking up find this wheel has been making more than three times the mileage of any wheel we have ever used. The average has been more than 15,000 miles."

THORNTON TROLLEY WHEEL CO., Inc., Ashland, Ky.



DIXON'S
SILICA—GRAPHITE PAINT

is a natural combination of silica and flake graphite. The vehicle is pure boiled linseed oil. It will not crack or peel off because of the natural elasticity of the flake graphite, while the silica furnishes the wear-resisting qualities. Because of these qualities, Dixon's Paint affords better and longer protection. By making frequent repainting unnecessary, it lowers the cost of paint upkeep. *Write for Booklet 180-B*

Joseph Dixon Crucible Co.
Jersey City, N. J.
Established 1827

THE WORLD'S STANDARD
"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.
Sales Representatives in the Principal Cities

The Most Successful Men in the Electric Railway Industry read the

ELECTRIC RAILWAY JOURNAL

Every Week

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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1 to 3 inches	$4.50 an inch
4 to 7 inches	4.30 an inch
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Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

ERJ

POSITIONS VACANT

EXPERIENCED track foreman: Energetic man wanted on city work. Give references and experience in detail. P-930, Electric Railway Journal, Tenth Ave. at 36th Street, New York.

POSITIONS WANTED

ACTIVE young man, single, age 22, over three and one half years special training with large builder of street railway cars and trucks, desires change to mechanical department of operating company with opportunities for advancing. Can arrange for an interview with any interested party at Cleveland convention and solicit correspondence of others not attending. PW-927, Electric Railway Journal, 1600 Arch Street, Philadelphia, Pa.

ACTIVE young man, age 27, over five years' experience in street railway operation, trained in traffic, transportation, commercial and research work, desires for personal reasons to make change. PW-933, Electric Railway Journal, Guardian Bldg., Cleveland, O.

SUPERINTENDENT with twenty years' experience in operation and maintenance of railway rolling stock and track; an outstanding success as a railway operator and as operator of co-ordinated railway and bus services desires for personal reason to make change. Fully capable of taking complete charge as manager or superintendent. PW-925, Electric Railway Journal, 7 South Dearborn St., Chicago, Ill.

SUPERINTENDENT of transportation: Qualified by a former successful record of twenty years on large city and interstate properties also co-ordination of rail and bus service recognized as an official of exceptional ability, successful in rehabilitation of properties, public relations, accident prevention, one man operation and handling of labor. Fully competent to take over any property and get results. High-grade references, correspondence invited. Will make appointments for interview at Cleveland convention or at convenience of interested parties. PW-926, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

SUPERINTENDENT of transportation: With unquestionable qualifications, wide experience, fine record of achievements on city and interurban properties, credited with having built up one of the best groups of trainmen in the Middle West and placing property on paying basis, at present engaged, wishes to make connection with a property that is in need of a clean cut, progressive, capable transportation official. High-grade references. Correspondence invited. Can arrange for interview at Cleveland convention. PW-934, Electric Railway Journal, Guardian Bldg., Cleveland, O.

YOUNG man wants position providing an opportunity of learning electric railway practice. Graduate of a co-operative coarse in electrical engineering. PW-932, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

Wanted—

60 to 85 ton Electric Locomotive—railway voltage.

2—1000 kw. Railway Rotary Converters, 60 cy., 3 or 6 ph.

For Sale—Special Bargains

BIRNEY CARS

6—Standard Single Truck Double End.

MOTORS

32—Westinghouse 306 SV Motors.

AIR COMPRESSORS

10—General Electric CP-27 Air Compressors.

8—Westinghouse DH-16 Air Compressors.

CONTROLLERS

12—K-35-G-2 Controllers.

IRVING S. VAN LOAN CORPORATION

1750 Broadway, New York City

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built

West. 508 or G.E. 264 Motors

Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

WHITE 2½ TON

LINE TRUCK

McCardell three section tower. Less than 3 years old and in excellent condition. Electric starter and lights.

Prompt reply advisable as this equipment must be moved quickly.

FS-931, Electric Railway Journal
Tenth Ave. at 36th St., New York City

ELECTRIC SHOVEL

1½-yd. Vulcan, standard gage, 600 v., d.c. shovel. In first class condition. Must be moved at once so only $1,700.00 will buy it.

ZELNICKER IN ST. LOUIS

Rails Equipment Steel Piling, etc.

ROTARY CONVERTERS

2—Converter and Transformer units new in 1924.
Can be seen in operation at Warehouse Point, Conn.
Synchronous Converters
No. 4006698—4006699 G.E.
Type H.C.C. 6—500—1200.
Form P. Speed 1200 Direct Current.
Amperes 834 Nominal Volts 600 3 Phase, 1250 Amp. 2 hrs. 55 degrees C Rise.

TRANSFORMERS

Type H.J.T.H.
Form D.D. Volts 13200 Y 445 Cycle 60
Capacity 500 K.V.A. Nominal.
750 K.V.A 2 hrs. 60 Degrees C Rise.
Reactance 12% approx.
G.E. Regular Coil H. Design.
Immediate delivery can be made.

THE PERRY BUXTON DOANE CO.

Boston, Mass.

FOR SALE

Standard Birney Safety Cars

2—Double end, 34 capacity, G. E. motors and lightning arresters, West. air brakes, Safety car devices, Economy meters, International registers, 42-in. gage.

The Denver & So. Platte Ry. Co.

210 Tramway Bldg., Denver, Colo.

SAVE 30% TO 50% ON

RAILS-LOCOMOTIVES-CARS

Economy—Service
Quality—Reliability

HYMAN-MICHAELS COMPANY

Peoples Gas Bldg., Chicago

ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

"Opportunity" Advertising:

Think "*SEARCHLIGHT*" First!

G-02

WHAT AND WHERE TO BUY

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.
Columbia Machine Works

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Johnson & Co., J. R.
National Railway Appliance Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.

Babbitt Metal
Johnson & Co., J. R.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Bearings and Bearing Metals
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A.

Bearings, Roller and Ball
Timken Roller-Bearing Co.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Cummings Car & Coach Co.

Body Material—Haskelite & Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Columbia Machine Works
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Lining, Asbestos
Johns-Manville, Inc.

Brake Shoes
American Brake Shoe & Foundry Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Traction Brake Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.

Brush Holders
Columbia Machine Works

Building Materials, Fireproof
Johns-Manville, Inc.

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Garford Motor Truck Co.
Mack Truck Co.
Yellow Truck & Coach Mfg. Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.
Columbia Machine Works

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnished
Irvington Varnish & Ins. Co.
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Brass, Composition or Copper
A. & J. M. Anderson Mfg. Co.

Castings, Gray Iron and Steel
American Steel Foundries.
American Bridge Co.
Bemis Car Truck Co.
Wm. Wharton, Jr. & Co., Inc.

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood Panels
Haskelite Mfg. Corp.

Cements, High Temperature
Johns-Manville, Inc.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
A & J. M. Anderson Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Dossert & Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compounds, Insulating
Johns-Manville, Inc.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Conduits, Fibre
Johns-Manville, Inc.

Conduit Duct Underfloor
Johns-Manville, Inc.

Connectors, Solderless
Dossert & Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Wks.
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying and Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments Measuring Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., J. A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoist & Lift
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossing, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Crossing Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Denver & So. Platte Ry. Co.
Elec. Equipment Co.
Hyman Michaels Co.
Irving S. Van Loan Corp.
Perry Buxton Doane Co.
Salzberg Co., Inc., H. E.
Zelnicker, in St. Louis

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Electric Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
National Pneumatic Co., Inc.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.

Doors Folding Vestibule
National Pneumatic Co., Inc.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Sup. Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
Amer. Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., John A.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Byllesby & Co., H. M.
Day & Zimmermann, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Perey Mfg. Co., Inc.

Fare Registers
Electric Service Sup. Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Flaxlinum Insulators
Nat'l Ry. Appliance Co.

Floodlights
Elec. Service Supplies Co.

Floor, Sub.
Haskelite Mfg. Corp.

Flooring, Monolithic
Johns-Manville, Inc.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Carnegie Steel Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co., Inc.

Furnaces, Electric Steel, Melting
American Bridge Co.
American Brown Boveri Elec. Corp.

Fuses and Fuse Boxes
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets, Asbestos
Johns-Manville, Inc.
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.
Westinghouse E. & M. Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.

Gauges, Oil & Water
Ohio Brass Co.

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Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.

Gear Cases
Chillingworth Mfg. Co.
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Gears and Pinions
Bethlehem Steel Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.

(Continued on page 42)

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
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PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
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DALLAS, TEX., 2001 Magnolia Building
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Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

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HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

AIMCo Electric Railway Automatic Signals

REG. U. S. PAT. OFF.

for Accessibility and Reliability

EST. 1865 AIMCo INC. 1916

"American" INSULATING MACHINERY COMPANY

REG. U. S. PAT. OFF.

Philadelphia, New York, Paris, England

Sales Agents:

Electric Service Supplies Co.
Philadelphia New York Chicago

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company
The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.
Can. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor G. Mendoza Co., Havana.

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

Reg. U. S. Pat. Office

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal: Chicago, 20-32 West Randolph Street: Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

Arc Weld Rail Bonds

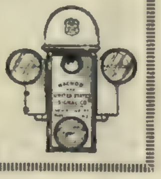
AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago New York Boston Cleveland Pittsburgh Denver
U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

NACHOD & UNITED STATES SIGNAL CO., INC.
LOUISVILLE, KY.



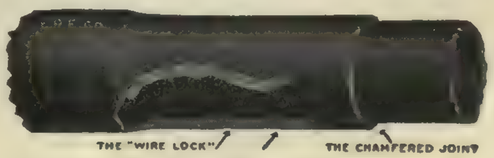
BLOCK SIGNALS FOR ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS

RAIL GRINDERS AND WELDERS

Railway Track-work Co., Philadelphia

682

ELRECO TUBULAR POLES



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Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

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Nachod & U. S. Signal Co.
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Nachod & U. S. Signal Co.

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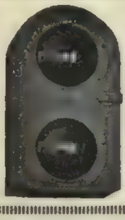

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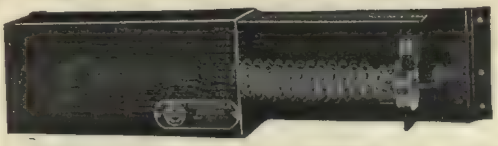

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Electric Railway Improvement Co.
Lorain Steel Co., The
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Electric Railway Improvement Co.
Metal & Thermit Corp.
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Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

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Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Electric Railway Improvement Co.
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National Railway Appliance Co.
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Welding Wire
American Steel & Wire Co.
General Electric Co.
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Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron

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Inc.
Okonite-Callender Cable Co.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.

41%

Gross return on investment proves that—

New Cars Pay

Actual
Operating Costs
OLD CARS
1922

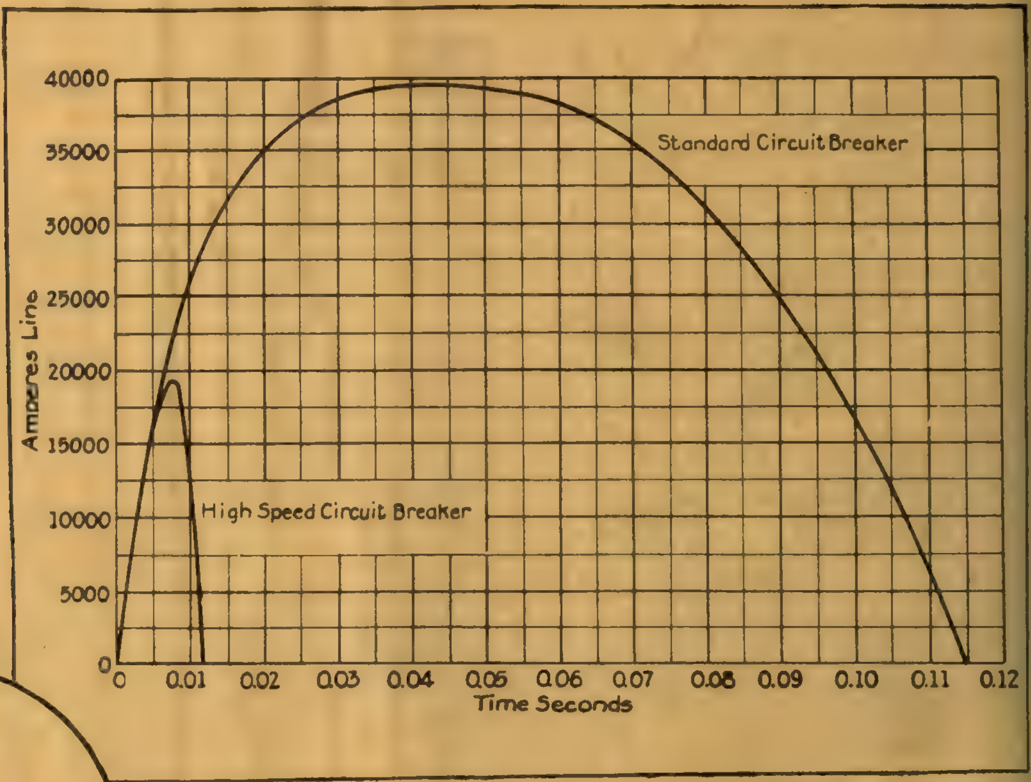
	Per Car Mile
Way and Structures	7.07c.
Equipment	6.19
Power	8.52
Conducting Transp.	13.94
General and Misc.	11.68
Total	47.40c.

Actual
Operating Costs
NEW CARS
1925

	Per Car Mile
Way and Structures	7.43c.
Equipment	2.66
Power	5.46
Conducting Transp.	12.67
General and Misc.	11.30
Total	39.52c.
Saving	$30,065
Approx. Invest.	72,500
Gross return on investment	41%

In 1923 the Pennsylvania-Ohio Electric Co. placed in service on its Youngstown-New Castle Division four (4) new 37,000 lb. cars equipped with 35 h.p. motors, displacing an equal number of 54,000 lb. cars equipped with 90 h.p. motors. From resultant economies obtained thus far indications are that these new cars will pay for themselves in less than three years time.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



High-Speed Breaker installed on Automatic Reclosing Feeder Panel.

The measure
of the added protection

The decision to install high-speed air circuit breakers puts the finishing touches to the layout of a modern, well-protected railway substation.

The G-E High-Speed Breaker has the following important characteristics:

- Very effective rupturing of arc due to magnetic blowout and narrow slots in the arc chute.
- Electro-magnetic tripping without mechanical latches.
- Electro-magnetic, pneumatic, or manual closing.
- Trip-free feature for closing under load.
- Selective feature permitting discrimination between over-loads and short-circuits.
- Self-contained for installation in any convenient location.

Ask for Bulletin 44742-1, which describes this equipment.

3-15

GENERAL ELECTRIC

McGraw-Hill Publishing Company, Inc. September 25, 1926 Fifty Cents per Copy

ELECTRIC RAILWAY JOURNAL

MAKING TRANSPORTATION PAY!

In Cleveland, The Convention City

Transportation—modernized and co-ordinated,—has been put to the test. And from Cleveland, the Convention City, as from other properties throughout the Country has come the verdict that "Modern equipment and improved methods pay."

Cleveland has been thorough in its program. Every detail tending to better service has been given attention. And, as in the case of other progressive roads, this has included an extensive installation of Phono-Electric Trolley Wire.

See our announcement on pages 14 and 15.

"Bridgeport" BRASS CO. TRADE MARK
Phono-Electric

Facing Forward with Steady Stride

NOT in recent years has the Electric Railway industry faced prospects so bright. Clouds of misunderstanding have rolled away; dawning is a new era of sound prosperity.

The public has come to appreciate the importance of mass transportation—to realize that it is a service worthy of its hire; that, for the community good, it must be conducted on a sound, profitable basis.

The industry has largely corrected its own ills. It has cultivated public confidence and understanding. It has learned to sell transportation, with modern, attractive cars, improved service, and coordination of the facilities for service. It is winning back the public patronage and support.

This much has been done. The industry is facing forward and marching on with a steady stride. But there is still work ahead—there are yet problems to be solved and difficulties to be overcome.

To the A. E. R. A. and the industry it represents, in the work ahead Westinghouse pledges its continued support, with redoubled effort that it may better serve; that it may help to bring about the stabilization and continued progress of the transportation industry.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

Westinghouse

X90010

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Cleveland

The Convention City

One of the New Cleveland Two-car Trains Loading for an Outboard Trip from the Public Square.

W
WESTINGHOUSE ELECTRIC

(Above)—The Pit Tracks in One of the Large Bays of the Motor Shop. (Right)—One of the Units in a 3,000 kw. Automatic Substation. X90011

The Cleveland Railway Is

Westinghouse Equipped

THE Cleveland Railway holds more than ordinary interest for A. E. R. A. men. It is a railway that has attained the highest rank in good service, modern equipment, and public confidence. Here were developed some of the outstanding achievements of modern railway engineering—the 1500 kw. 60 cycle converter, of which thirty seven are in successful operation in Cleveland, and the first application of automatic substations with supervisory control to railway power in metropolitan areas.

The Peter Witt car, which paved the way for the modern light-weight equipment, was first introduced on the Cleveland Railway.

The Westinghouse No. 340 low-floor type, 50 hp. motor, of which there are 2500 in service in Cleveland, and the cabinet HL control were also developed on this property.

The maintenance methods of Cleveland Railway have attracted widespread attention. All of the modern shop and maintenance of way equipment is provided with individual Westinghouse motor drive.

You can profitably study the Cleveland Railway during the convention. Dependable Westinghouse equipment has contributed much to the remarkable success of a remarkable transportation system.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

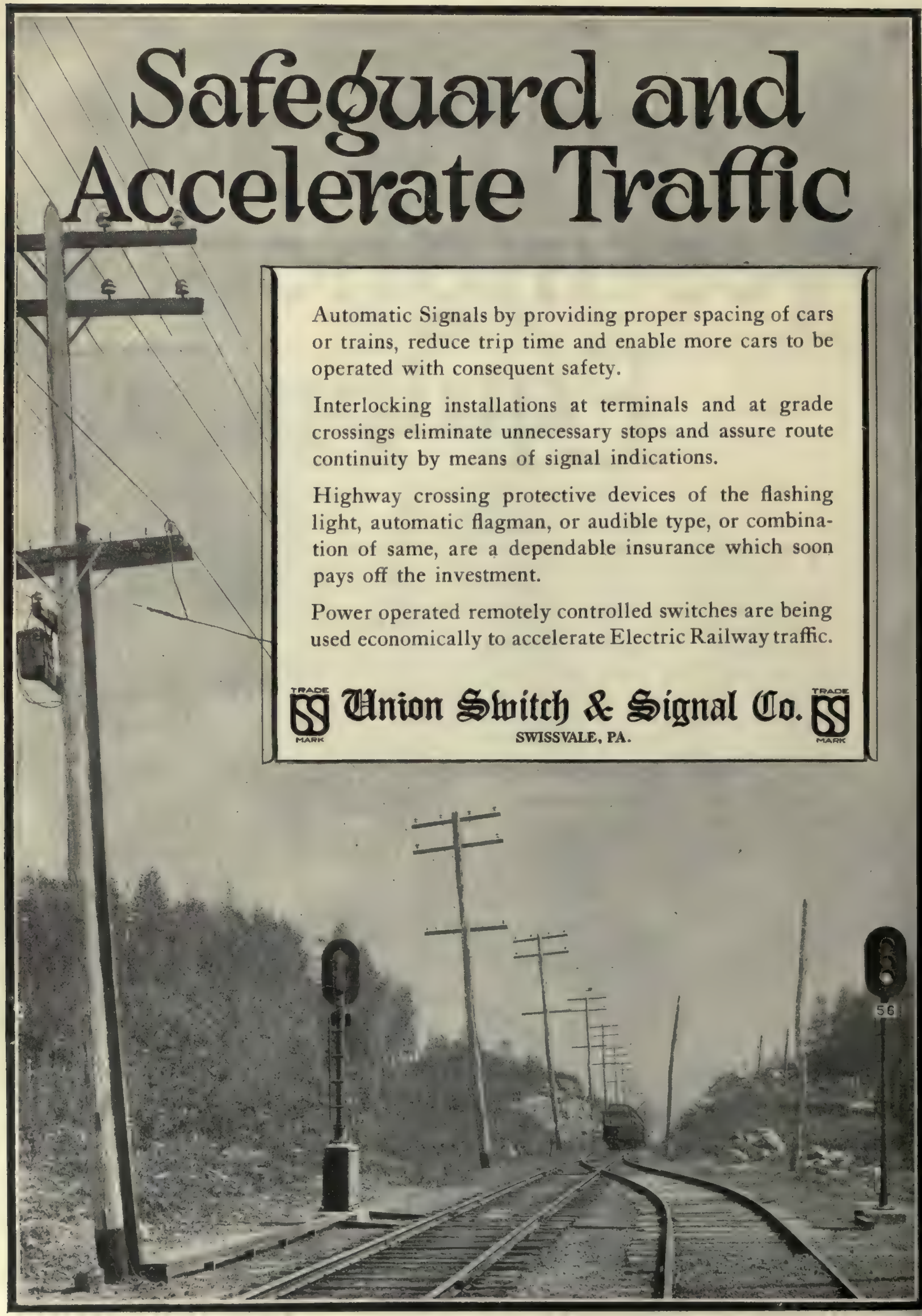
MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION
AERA
1926

Westinghouse

X90012

WESTINGHOUSE ELECTRIC

PIONEERS IN RAILWAY ELECTRIFICATION



Safeguard and Accelerate Traffic

Automatic Signals by providing proper spacing of cars or trains, reduce trip time and enable more cars to be operated with consequent safety.

Interlocking installations at terminals and at grade crossings eliminate unnecessary stops and assure route continuity by means of signal indications.

Highway crossing protective devices of the flashing light, automatic flagman, or audible type, or combination of same, are a dependable insurance which soon pays off the investment.

Power operated remotely controlled switches are being used economically to accelerate Electric Railway traffic.

TRADE MARK **Union Switch & Signal Co.** TRADE MARK
SWISSVALE, PA.

Walter Bates Steel—

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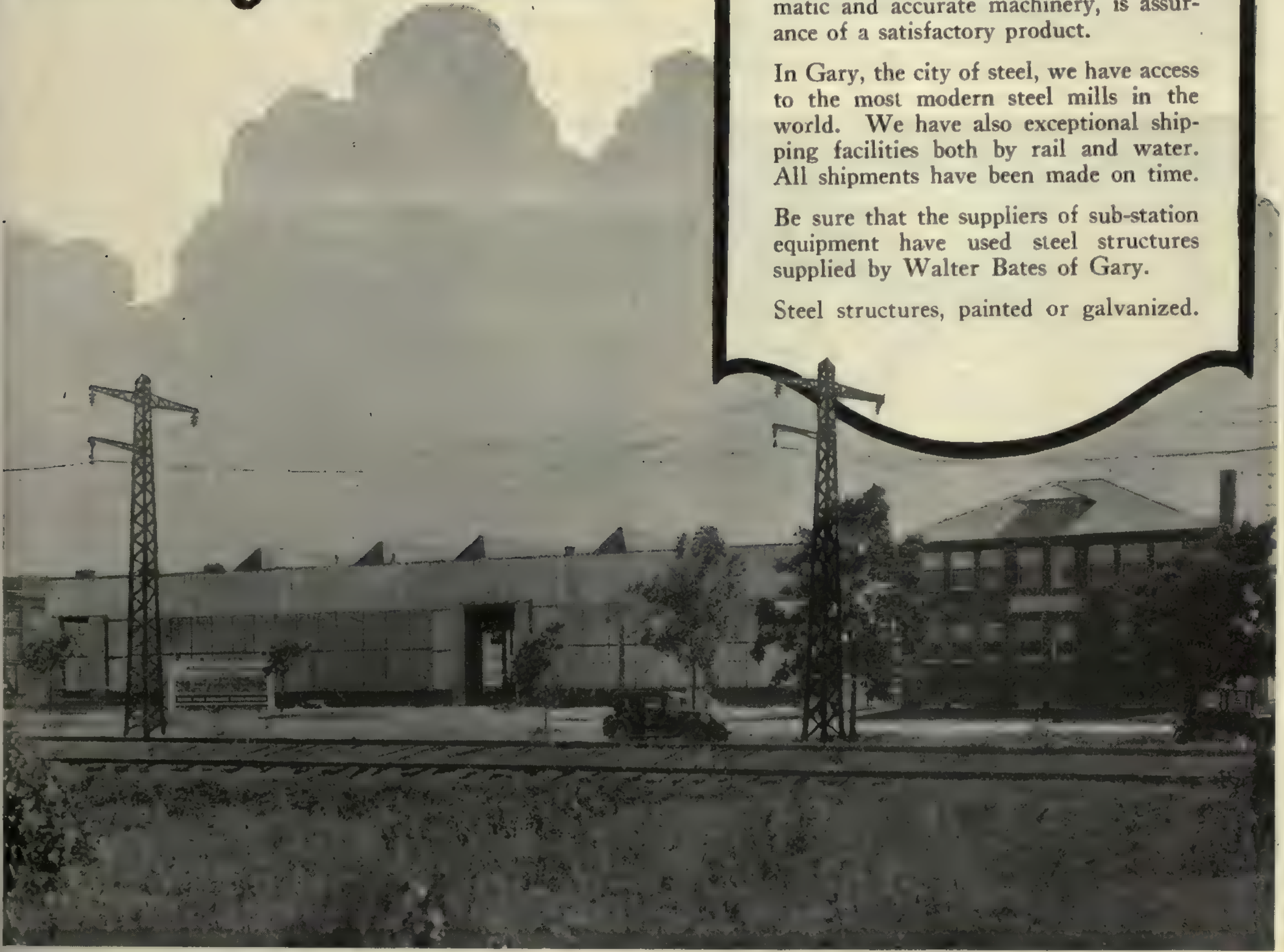
Poles
Towers
Sub-stations
Railway Electrification



Specialists Serve You

Functioning thru every department of our organization are men whose experience dates back for years. This, in union with extensive resources, a large, modern plant, specially designed automatic and accurate machinery, is assurance of a satisfactory product.

In Gary, the city of steel, we have access to the most modern steel mills in the world. We have also exceptional shipping facilities both by rail and water. All shipments have been made on time.

Be sure that the suppliers of sub-station equipment have used steel structures supplied by Walter Bates of Gary.

Steel structures, painted or galvanized.

Everything in Steel Supporting Structures

WALTER BATES STEEL
CORPORATION

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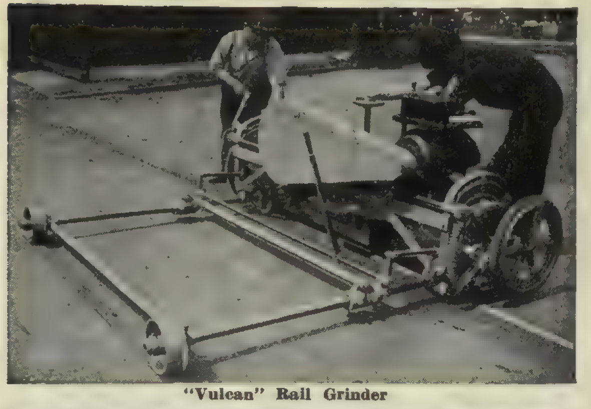
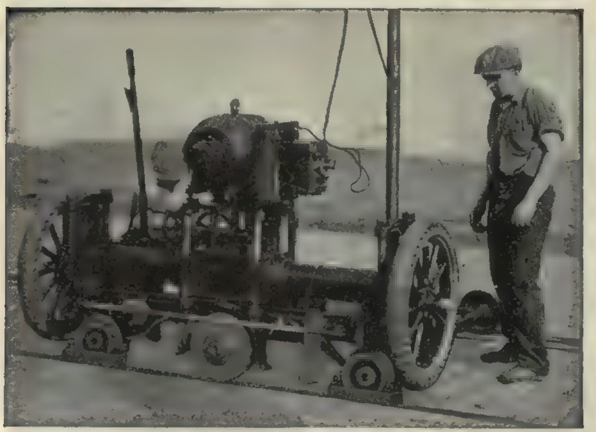
Reciprocating Track Grinder

"Hercules" Swing Frame Rail Grinder



"Vulcan" Rail Grinder



"Imperial" Track Grinder

"Midget" Rail Grinder

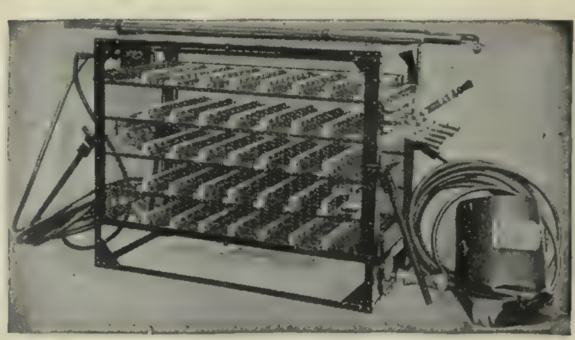
You KNOW
Let's see abou

Let's see about making these new, economical, attractive cars still more economical and more comfortable;—then you'll be able to add a few more cents to every profit-dollar produced by modernizing and merchandising.

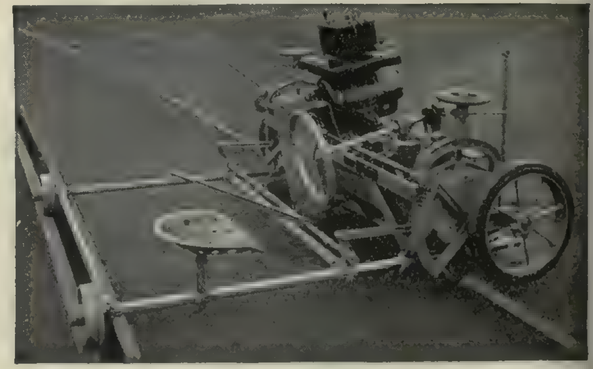
The way to do is to bring *and keep* trackwork up to the standards that 1926 service requirements have set.

For whether cars be new or old, passengers do not like being jolted about over corrugated rails, worn special work or cupped joints.

And whether cars be 1926 or 1906 models, the vibration and shock caused by poorly maintained track, will have the same expensively destructive effect on every part.



"Ajax" Electric Arc Welder



"Improved Atlas" Rail Grinder

that it pays to modernize— making it pay better!

Hence, while experience has shown now that new cars may make all the difference between receivership and dividends, it has demonstrated also that modern track maintenance adds those extra cents to the profit-dollar which become the foundation for continued prosperity.

Hundreds of successful roads,—long users of OUR equipment,—know that modern methods of track maintenance pay them.

When you attend the Convention, please be sure to visit our booth. We have some interesting new features to explain and some convincing results to show you.

Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

Chester F. Gailor, 30 Church St., New York
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H. F. McDermott, 208 S. La Salle St., Chicago
Equipment & Engineering Co., London
P. W. Wood Railway Supply Co., New Orleans, La.
Frazar & Co., Japan

AJAX
Contact Pole
and Hook—

This ingenious AJAX CONTACT HOOK permits the trolleys to pass, and at the same time clamps the wire tightly, making contact not only above but also underneath where the wire is worn bright. The weight of the pole clamps the jaws. It will handle up to 300 amperes without injury. Arcing and local overheating of the trolley wire are eliminated.

These roads and many others have proved that modern cars and modern equipment pay—and they all use our equipment for keeping track up to modern standards

Philadelphia Rapid Transit Co.
Boston Elevated Railway Co.
Brooklyn City Railroad
Eastern Massachusetts St. Ry. Co.
Pittsburgh Railways Co.
Third Avenue Railway Co., New York City
United Railways & Electric Co., Baltimore
New York State Railways
International Railways Co., Buffalo
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Cincinnati Street Railway Co.
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Illinois Traction System
Brooklyn-Manhattan Transit Corporation
Connecticut Company
Milwaukee Electric Railway & Light Co.
Public Service Railway Co., Newark
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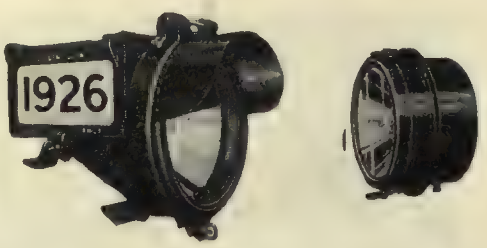
1294

SAVING THE RAIL SAVES THE RAILWAY

Car Equipment that



Golden Glow Headlights

Though projecting powerful and well concentrated beams of light, the greenish-yellow glass reflector eliminates any glaring and dazzling effect by absorbing the violet and blue rays. This glass reflector will not scratch, tarnish or corrode. Golden Glow Headlights are made in various styles and sizes to suit every requirement. Provide this safety for your passengers and your equipment.

Pullman Type

Safety Type

Keystone Lighting Fixtures

The bright, steady, well-diffused light provided by these lighting fixtures is a practical necessity in well-equipped cars. Manufactured to the Keystone standard of quality, these lighting fixtures are both ornamental and durable. They add attractiveness and increase patronage.

Keystone Trolley Catchers

Mechanically sound design and construction enables these ever-reliable catchers to catch the trolley an instant after it leaves the wire. This saves considerable wear and tear on the overhead system as well as the time and expense required for repairs and delays in service.

Keystone Rotary Gongs

Designed for giving at a slight pressure of the foot from one to fifteen strokes—regulated at the will of the operator. This loud and distinct alarm provides an effective warning even in noisy surroundings. Such gongs are merely common-sense protection for equipment and passengers in these days of congested and noisy traffic.

KEYSTONE

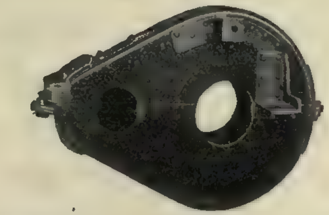
elps to sell your Service!

Hunter-Keystone Destination Signs

"Tell the public where you're going" with these clear, clean, readable signs. Bold white letters on black roller curtains make for high visibility by day and by night. They advertise your service and establish your routes.

Faraday Car Signals

The installation of these reliable and convenient passenger signal systems enables passengers to signal the operator without commotion and distraction of his attention. Made for every requirement—high or low voltage systems, buzzers, vibrating bells or single-stroke bells, resistance panels, flush or surface type push buttons. A convenience your passengers appreciate.



Keystone Gear Cases

Made of soft, open-hearth, deep-drawing steel—tough enough to protect the gear and pinion body and to absorb vibration—yet flexible enough to prevent serious accident. Both riveted and spot welded. Halves of any given type are interchangeable.

See our Exhibit Booths
216, 217, 218
230, 231

Partial list selected from Catalog No. 7

- Motormen's Seats
- Line Material
- Employees' Badges
- Portable Lamp Guards
- Air Sanders
- Fare Registers
- Trolley Harps and Wheels
- Pinion Pullers
- Insulating Material, etc.

Ask for a copy of Catalog No. 7

ELECTRIC SERVICE SUPPLIES Co.

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DETROIT
General Motors Bldg.

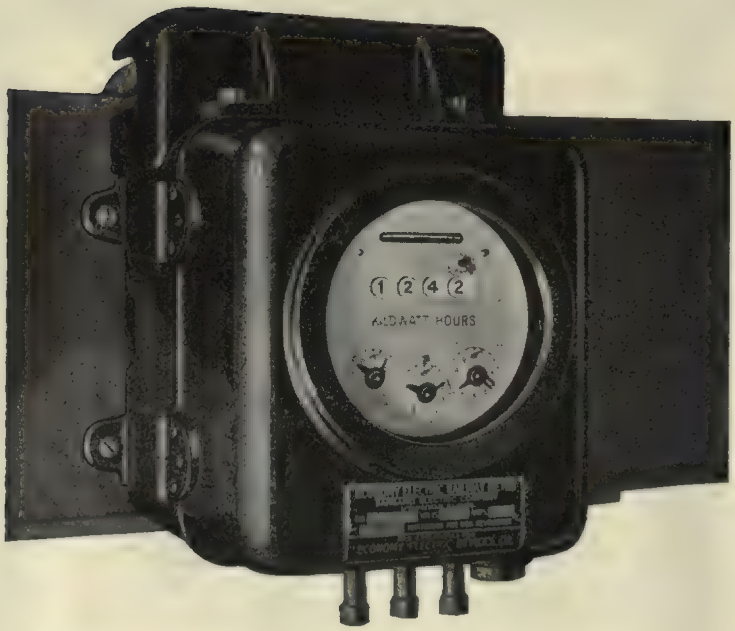
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

CAR EQUIPMENT

Cleveland

Through the use of Economy Meters a continuous saving of over 10% of the total Traction Energy has been made each month since meters were installed. Here follow the actual results for the last few months:

Month	Kw.-Hrs.	Miles	Kw.-Hrs. per C-M	Blind	Per Cent Saving
May..........	7,404,905	2,772,479	2.67	3.03	11.9
June.........	7,314,503	2,740,373	2.67	3.03	11.9
July..........	7,243,884	2,741,731	2.64	3.03	12.9
August....... (1st half)	3,599,391	1,368,464	2.63	3.03	13.4



The Cleveland Railway Company, early in 1925 ordered 1076 Economy Meters with which to equip all its active motor passenger cars. Installation was completed by August, 1925. Since that time, by means of the meter, and a very efficiently directed power saving campaign, the above economies have been practically duplicated each month.

Economy Meters

Saves Power

Economy Railway Watthour Meters—

For Measuring Traction Energy on Electric Railway Cars and Locomotives and on Gas-Electric Rail Cars and Buses.

More than 200 properties, operating 25,000 cars, are using ECONOMY Watthour Meters on every car. The primary purpose is to save energy by stimulating competitive interest between motormen. Such savings usually range from 10 to 20% of the total traction energy.

Another important feature of the ECONOMY Meter is the "Car Inspection Dial" by means of which car equipment inspection intervals are scientifically determined in accordance with the actual work done.

This meter, built by the Sangamo Electric Company, has mercury-cushioned rotating parts which assure high accuracy under railway and bus operating conditions.

Economy Electric Devices Company

37 W. Van Buren St., Chicago

Distributors or Agents for

Sangamo Economy Meters
Peter Smith Heaters
The Air Rectifier
Woods Fare Boxes
Bemis Boyerized Truck Specialties

Three wires

for service in

Phono-Electric

the Triple Wear Wire

The standard for thirty years past, wherever traffic is heavy, and wire wear a serious factor.

Phono-Electric combines high tensile strength and conductivity in their most practical ratio for average city and suburban service, where the feeder system is good, and cars are operated at high speed on short headway.

It shows exceptionally high resistance to fatigue, with a wear factor conservatively two to three times greater than for hard drawn copper.

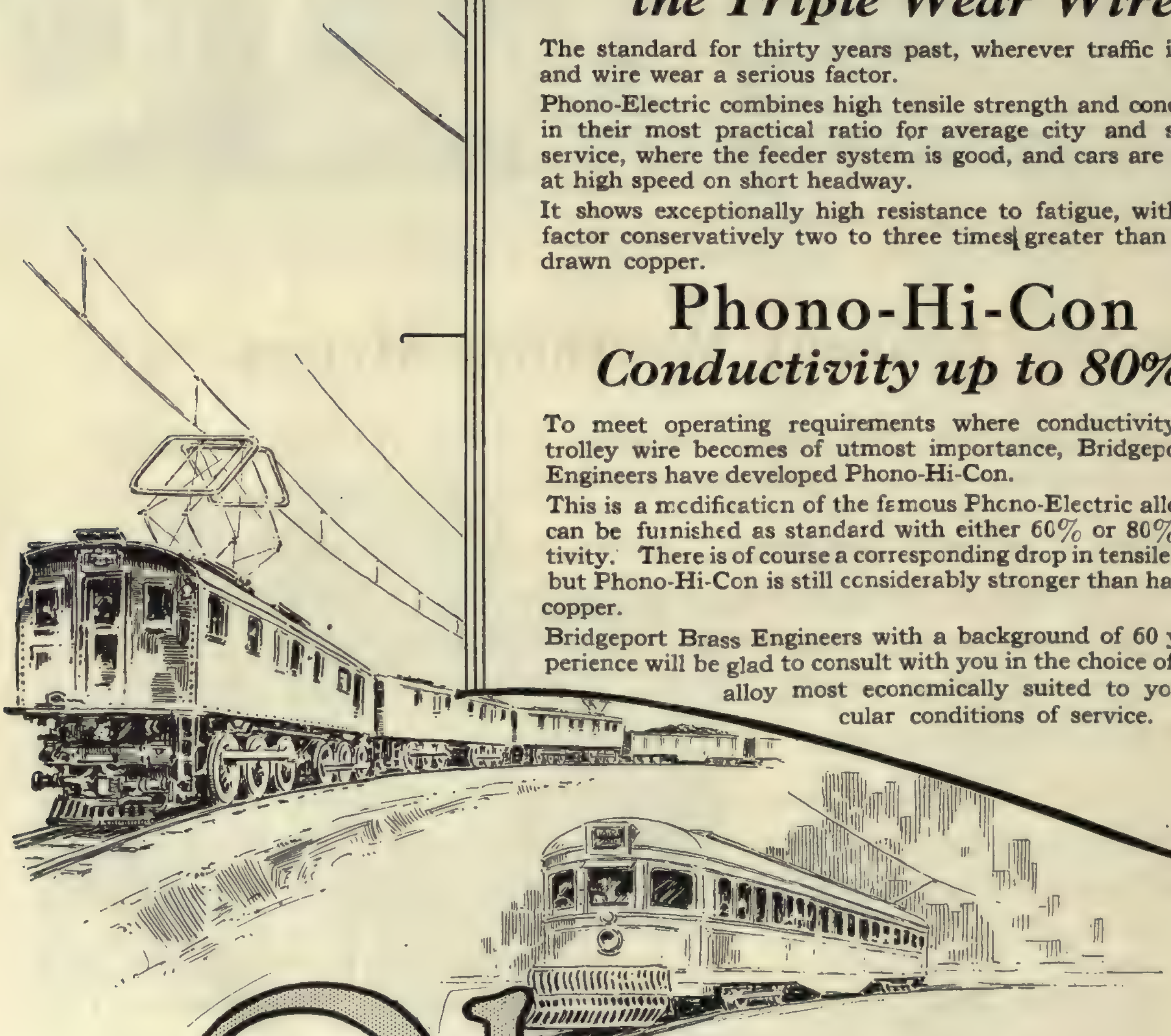
Phono-Hi-Con

Conductivity up to 80%

To meet operating requirements where conductivity in the trolley wire becomes of utmost importance, Bridgeport Brass Engineers have developed Phono-Hi-Con.

This is a modification of the famous Phono-Electric alloy, which can be furnished as standard with either 60% or 80% conductivity. There is of course a corresponding drop in tensile strength, but Phono-Hi-Con is still considerably stronger than hard drawn copper.

Bridgeport Brass Engineers with a background of 60 years' experience will be glad to consult with you in the choice of a Phono alloy most economically suited to your particular conditions of service.



Phono

Phono-Electric

Phono-Electric

# of merit

electric transportation

Phono-Hi-Strength

the corrosion proof messenger

At an early stage in the development of steam railroad electrification and high speed interurban services, operators were faced with the problem of excessive overhead maintenance. Steel catenary supporting wires proved subject to very rapid corrosion. Painting involved heavy labor costs, and serious service delays. Bridgeport Brass Engineers, working on this problem, finally perfected a standard messenger cable combining the corrosion-proof qualities of Phono-Electric with the strength of steel. Phono Hi-Strength, as now supplied to such roads as the P. R.R., D. L. & W., Illinois Central, B. & M., the Norfolk and Western, the N. Y., N. H. & H. and the Virginian Railroad has a tensile strength of 120,000 to 135,000 lbs. with between 12 and 15% conductivity.

Phono-Electric Trolley Wire Service is thus complete and adapted to every class of service. A request to our head office at Bridgeport will bring you comparative test and operating data on all of these Phono Wires.

Bridgeport Brass Company
BRIDGEPORT - CONNECTICUT

Phono in Use

Don't fail to note the practical application of Phono Electric trolley and messenger wire on the outside tracks at the Cleveland Auditorium and at all heavy traffic points on the Cleveland Railways.

Electric

Eastside-Westside-

WESTINGHOUSE
AIR BRAKES

—develop a retarding force sufficiently powerful for stopping even the heaviest car quickly, to increase safety and permit faster schedules.

—provide automatic equalization, to minimize skidding and lengthen life of brake linings.

—relieve the driver of braking fatigue to increase safety and utility.

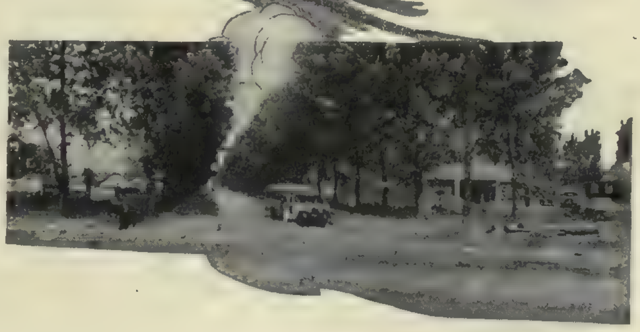
See our exhibits at the A.E.R.A. Convention

all over Cleveland!

WITH an even hundred motorized conveyances, the Cleveland Railways Company is augmenting its already efficient electric transportation service. Of these one hundred, sixty are single deck White buses, while the remaining forty are Six Wheel double deckers.

Radiating out from the Public Square, one group of buses take care of cross city transportation, while others operate in outlying districts as feeders to the established rail service. By giving this service, truly worthy of the city it represents, the Cleveland Railways Company has created a pleasurable reaction in the public mind that is evidenced by a reflected spirit of good will and increased patronage.

This entire fleet of air brake equipped vehicles is another distinguishing feature in the Cleveland Railways policy of giving a good service in a better way.



Westinghouse Traction Brake Co.
General Offices and Works
Wilmerding, Pa.

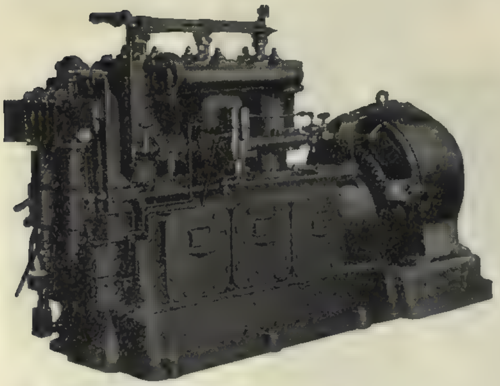
WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

Westinghouse Air in Automatic Substations

The Cleveland Railway is the pioneer user of automatic substations. They now operate seven of the latest type, which are equipped with electro-pneumatically operated contactors for controlling all heavy direct current circuits.

The air for these pneumatic contactors, as well as for cleaning purposes about the station, is supplied by a Westinghouse compressor outfit, comprising a standard DH-25 compressor—the same general type as that performing satisfactorily on hundreds of Cleveland cars—together with automatic governors and storage reservoirs.

Since full dependence is placed upon the continuity of substation operation to supply power for the movement of cars in the respective zones, it was essential that a dependable compressor be selected.



Westinghouse-National Air Compressor—
Direct-connected, self contained,
automatically controlled.

WESTINGHOUSE NATIONAL AIR COMPRESSORS

built in sizes ranging from 3 to 700 cu. ft. displacement, are ideal for use in car barns, shops, and power houses. They have established a reputation for long life, dependability, and economical operation.

Westinghouse Traction Brake Company
General Office and Works: Wilmerding, Pa.

"QUALITY MACHINES FOR QUALITY SERVICE"

Helping the Service sell itself—

The Merch

Night or day, Grand Rapids cars invite you—

And the quiet, comfort, safety, and promptness of the ride invite you again—and again.

andising Era—

THIS is the Merchandising Era in the electric railway field. Engineering and operating practices have reached a state of perfection far in advance of the selling effort. Today's greatest problem is a merchandising one.

The first principle of successful selling is to have a good product. More than anything else this embodies modern cars that invite riders, because of their attractiveness, comfort, speed, safety and freedom from unnecessary noise and vibration. Cars are moving advertisements, always before the public.

But the product cannot be right—the cars cannot be at their best—

> unless headlights are constant in their safety first performance;
>
> unless trolley wheels and harps, trolley bases and and catchers or retrievers can be depended upon to supply trouble-free service with a minimum of maintenance attention;
>
> unless overhead materials can be relied upon to give long life and consequent freedom from service interruption;
>
> unless the bonding of the rails is thorough and dependable so that maximum power is available;
>
> unless all these elements do their part well in contributing to a quality product.

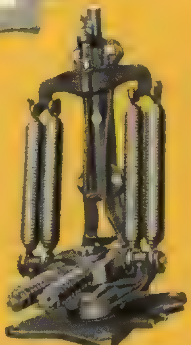
These are the characteristics built into O-B products. Their design and manufacture in every detail points to the one object, i. e, to contribute their functions with near-perfection in assisting the railway machine as a whole to produce a 1926 service that *can* be sold.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
196CB

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Equipment that helps sell Street Car Service



O-B Form 4 Trolley Base

A PERFECTLY balanced spring assembly insures uniform pole tension. Timken Bearings provide free rotary movement. Instant response to every variation of the overhead is the result.

O-B Marathon Trolley Ears

EXCEPTIONALLY long life—420,000 car passes and more—far fewer ear replacements and line breaks—these explain the world-wide use of Marathon Trolley Ears.

O-B Feist Wheel and Harp

TESTS by leading railways have shown that O-B Feist Trolley Wheels and Harps give two to three times the usual mileage with no maintenance.

O-B TITON Bond

A COPPER ARC WELD ball-of-rail bond with heavy steel, offset terminals. Gives large contact area—maximum conductivity—long life.

O-B Type BC Frogs

ON TESTS made by five properties, O-B BC Frogs averaged nearly half a million car passes. Many gave even longer service.

O-B Spring Lock Hangers

BY SOFTENING shocks from the wheel, under bracket arms and spans, O-B Spring Lock Hangers eliminate hard spots—reduce overhead wear.

O-B Tomlinson Couplers

TOMLINSON Automatic Couplers make both air and electrical connections. Interlocking disconnecting switch insures safe operation.

O-B ZP Special Headlight

LOW first cost and a construction that means low maintenance make the ZP Special ideal for city use. Has a prismatic reflector.

O-B Type C Splicer

GIVES unusual clearance and smooth underrun for trolley wheel. Wire enters in straight line. Quickly installed. Balanced construction.

O-B Trolley Catcher

POSITIVE "anti-step-up" construction prevents damage from flying trolley poles. Needs oil only infrequently. Very low maintenance.

ENDURANCE IS SERVICE INSURANCE –

Steel Twin Tie Track was born here in Cleveland 16 years ago. The first extensive installation was made that same year in Cleveland's streets. Sixteen years accumulation of successful experience; information; cost data, and manufacturing knowledge are here at the "Home of the Steel Tie," *and at your service.* Plan to ask about Steel Ties in Cleveland!

The International Steel Tie Company, Cleveland, Ohio

CONVENTION
EXHIBIT
SPACE
218A, 219A, 220A

Steel Twin Tie Track

Renewable Track **Permanent Foundation**

Many types— but all Safety Cars

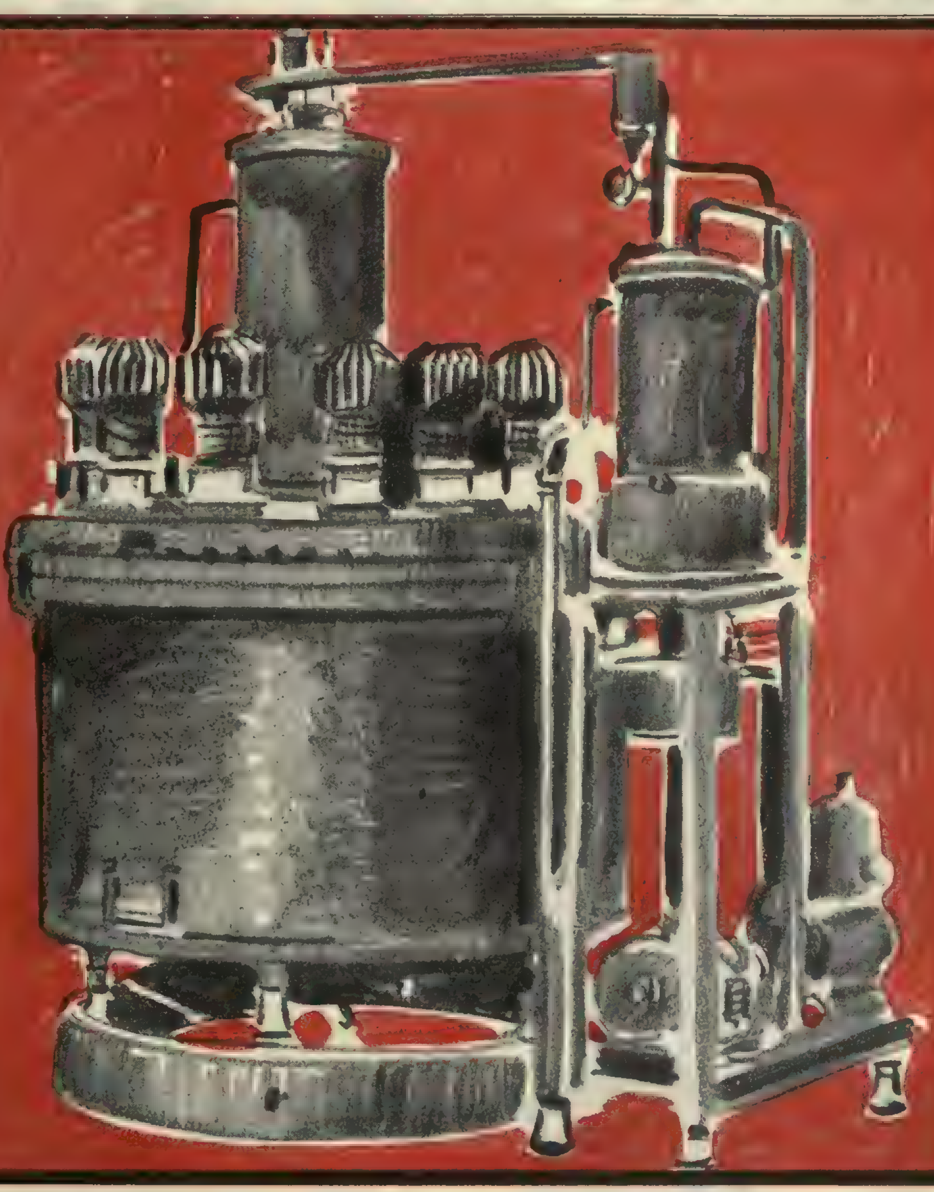
Modern types of cars are as varied as the communities they serve. Single truck, double-truck—single end, double end—all have their place in handling the peculiar problems within their zones of operation. High cars, low cars—long cars, short cars —but all Safety Cars where the best interests of a community and a will to serve vividly and economically are given thought.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

(3106)

It is a Safety Car if equipped with our standard Safety Car Control Devices

At the AERA Convention



TWELVE months ago, the Mercury-Arc Power Rectifier was considered little more than an interesting subject for discussion among American Engineers. Its long-established successful record in European countries was little known, here.

Today the Mercury-Arc Power Rectifier is an important factor in power distribution service on American electric railways. Its foothold is established through units actually in operation, and its wide-spread acceptance indicated through other units now being installed.

Next week, at the A.E.R.A. Convention, you will have an opportunity to see this American Brown Boveri product in actual operation.

American BROWN BOVER

Accepted practice!

Numerous installations of
Mercury-Arc Power Rectifiers
similar to that illustrated
here are already performing
satisfactorily. Our engineers
will be glad to cooperate in
arranging for inspection tri

ABB

To the A.E.R.A.

Mercury-Arc Power Rectifiers

Chief Advantages

1. Efficiency

From fractional output to maximum overload, the efficiency curve is higher than that of rotary equipment.

2. Simple Operation

Operation is characterized by extreme simplicity and a minimum of attention.

3. No Synchronizing

There is nothing to synchronize in starting up or throwing on line.

4. Very High Momentary Overload Capacity

Capable of handling sharpest momentary peaks, and short circuits cannot harm it.

5. Negligible Maintenance

Simplicity and ruggedness of construction and absence of moving parts results in virtual elimination of maintenance.

6. Low Weight

Comparative lightness in weight eliminates necessity for heavy, special foundations.

7. Noiseless Operation

Quiet, vibrationless operation permits location of substations in centers of dense population.

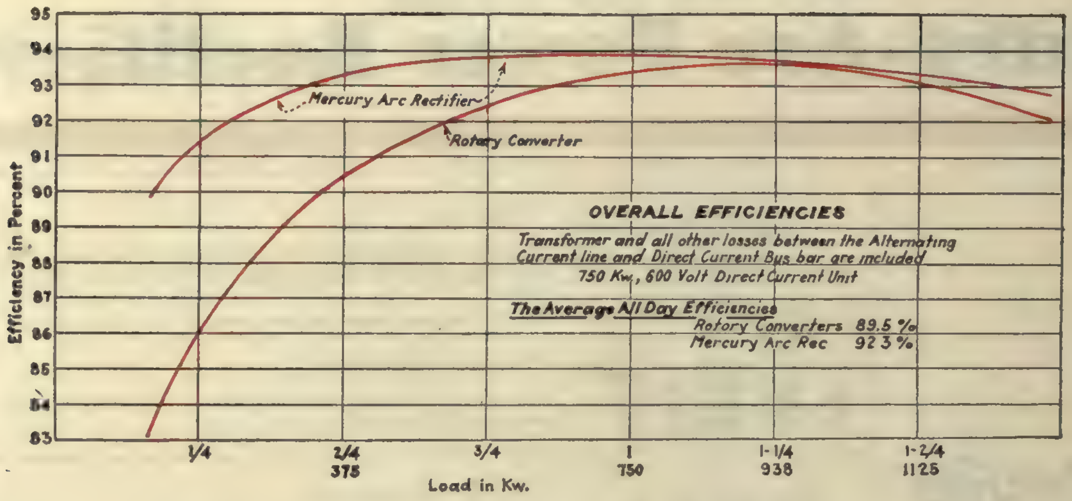
8. Light Construction for New Substations

Mercury-Arc Rectifiers can be installed almost anywhere, because they are so light in weight, and free from moving or rotating parts.

American Brown Boveri Electric Corporation
165 Broadway, New York, N. Y. Camden, New Jersey
922 Witherspoon Bldg., Philadelphia 842 Summer Street, Boston 230 South Clark Street, Chicago

AMERICAN
BROWN BOVERI

—then note the efficiency at all loads—



OVERALL EFFICIENCIES

Transformer and all other losses between the Alternating Current line and Direct Current Bus bar are included

750 Kw., 600 Volt Direct Current Unit

The Average All Day Efficiencies

Rotory Converters 89.5 %

Mercury Arc Rec 92 3 %

With an American Brown Boveri Mercury-Arc Power Rectifier

Under actual operation conditions, on an eastern interurban railroad, an American Brown Boveri Mercury-Arc Power Rectifier shows remarkably low conversion losses.

Compare the average over-all efficiencies on the above chart, taken from the daily performance of a 750 kw.-hr., 600 volt substation. For rotary converters the average was 89.5%. Increase in efficiency averaged 4.24% for the Rectifier.

Figure out what this saving means over a period of a year, on a 20-hour day at 1c. a kw. The annual saving is $730.00, plus the economy in maintenance. Estimate this attention charge at half that of rotary converters and you will appreciate what economy factors alone mean from the standpoint of a return on the investment.

These are some of the reasons for the rapidly growing acceptance of A-B-B Mercury-Arc Power Rectifiers for electric railway substation service throughout the United States.

Principal Products

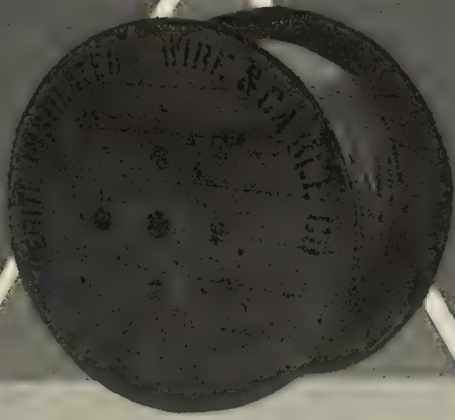
Mercury-Arc Power Rectifiers (steel enclosed)
Electric Locomotives—for any system of current, high or low tensions
Complete equipment for railway electrification
Rotary Converters
Motor Generators
Diesel-Electric Locomotives
Mining Locomotives
Switches, Controllers and all Auxiliary Equipment
Automatic Regulators
Steam Turbo Generators for normal or high pressures and superheats
Oil Switches
Condensers and Auxiliaries
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators
Ships
  Diesel Driven
  Turbine Driven
  Electrical Driven
  Structural Steel Fabrication

American Brown Boveri Electric Corporation

165 Broadway, New York, N. Y. Camden, New Jersey

922 Witherspoon Bldg., Philadelphia. 842 Summer St., Boston. 230 South Clark St., Chicago.

AMERICAN
BROWN BOVERI



The careful investor judges a security by the history of its performance.

KERITE

in a half-century of continuous production, has spun out a record of performance that is unequalled in the history of insulated wires and cables.

Kerite is a seasoned security.

THE KERITE INSULATED WIRE & CABLE COMPANY INC
NEW YORK SAN FRANCISCO CHICAGO

Lillibridge 80-668

Quiet cars earn

The last word in trolley base design

NUTTALL

TIMKEN EQUIPPED

TROLLEY BASE

Form U. S. 204

A simpler, longer-lived, easier to maintain trolley base, as far in advance of old designs as the modern car is of cars built twenty years ago. Timken has made a special double-race tapered type bearing for this service. Design is such that the base actually hangs on the bearings and not on the center pin, "cocking" strains are evenly distributed; all wearing parts hardened; and lubrication taken care of through a once-in-six-months oiling system.

See the exhibit at Space 110.

Nuttall

nore and cost less!

Build for passenger preference and sound operating economy with

NUTTALL Standard Helical Gears

(smooth, silent power transmission)

There's no doubt now about the electric railways being able to earn a good living. New cars,—modern cars,—built on a basis of passenger *preference*, have already proved a profitably sound nvestment. One of their most passenger-attractive features has been greater smoothness in operation, with less vibration and less noise.

This is a logical development. It can be carried still further,—to a point where gear noise is practically eliminated, where gear vibration is a thing of the past, and where the power transmission on an electric car is as smooth as on an automobile,—by the use of Nuttall Standard Helical Gears.

The meshing of helical gears is like the turning of a screw,—no grinding, and no chattering. Helicals save wear and tear on motors, car bodies and passengers' nerves. Their use results in really quiet cars.

And Nuttall Standard Helical Gears have the added advantage of the famous Nuttall B.P. Heat Treatment. They're guaranteed for 400% greater wear and breakage resistance than gears of standard untreated cast steel.

Visit our booth and let us give you full details, or write for bulletins on this interesting subject.

—Other NUTTALL SPECIALTIES include:

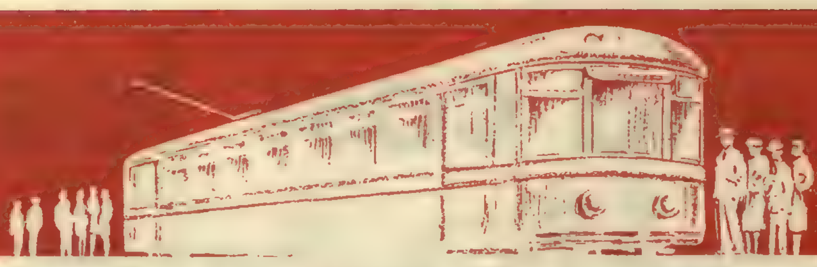
Nuttall Trolley Wheels.
Poles and Harps.
Nuttall Pantagraphs.
Nuttall Trolley Bases of all types for every class of service.

SEE OUR CONVENTION EXHIBIT—SPACE 110

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall



DAVIS "One-Wear" Steel Wheels

—*longer life and greater mileage*

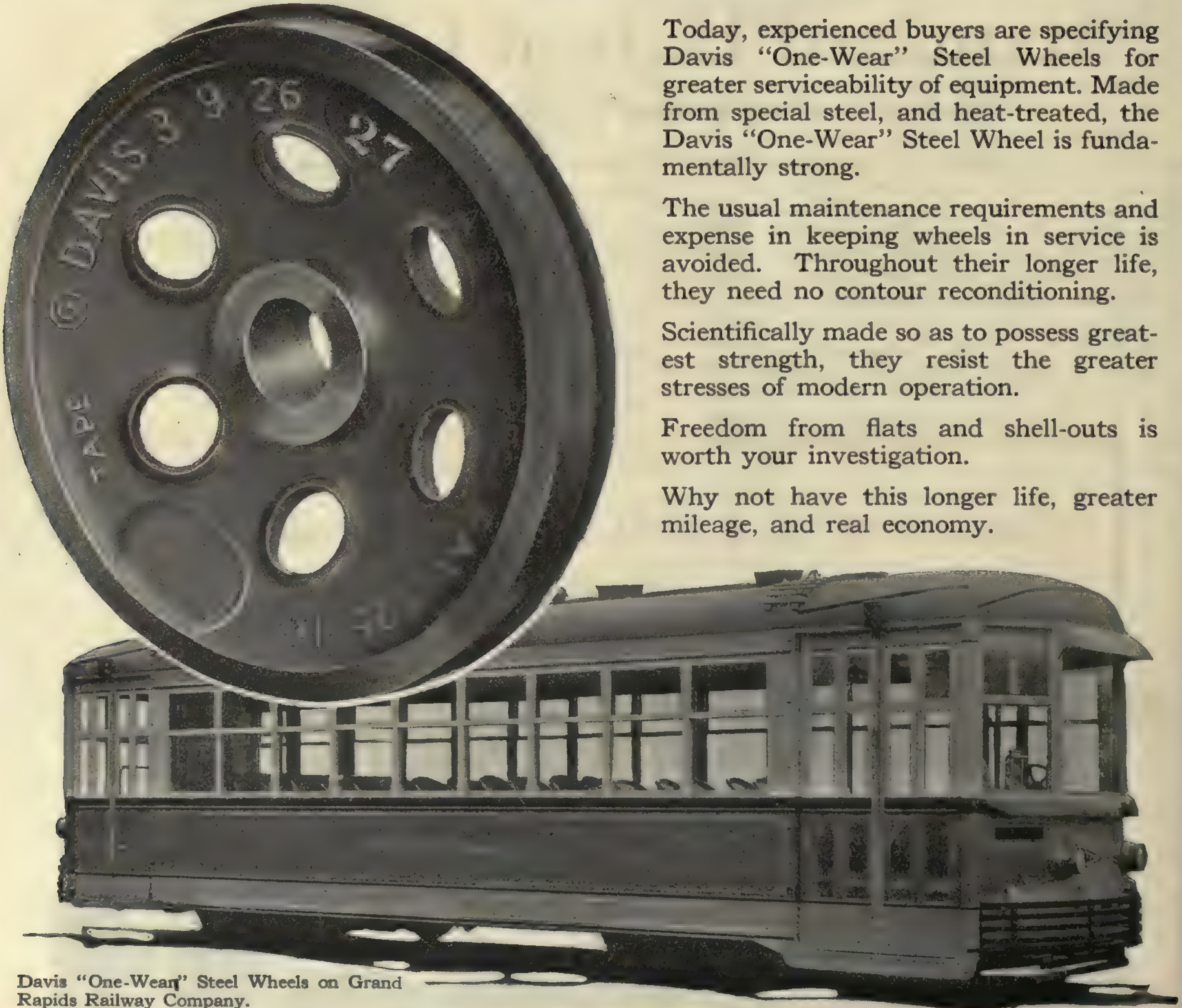
Today, experienced buyers are specifying Davis "One-Wear" Steel Wheels for greater serviceability of equipment. Made from special steel, and heat-treated, the Davis "One-Wear" Steel Wheel is fundamentally strong.

The usual maintenance requirements and expense in keeping wheels in service is avoided. Throughout their longer life, they need no contour reconditioning.

Scientifically made so as to possess greatest strength, they resist the greater stresses of modern operation.

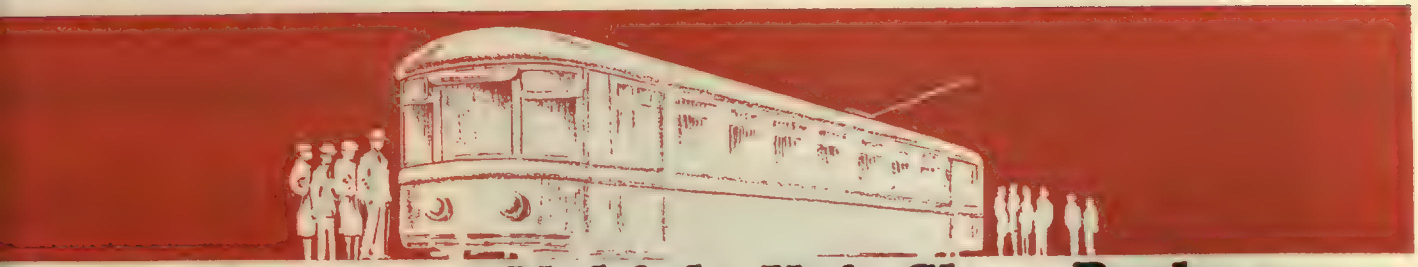
Freedom from flats and shell-outs is worth your investigation.

Why not have this longer life, greater mileage, and real economy.



Davis "One-Wear" Steel Wheels on Grand Rapids Railway Company.

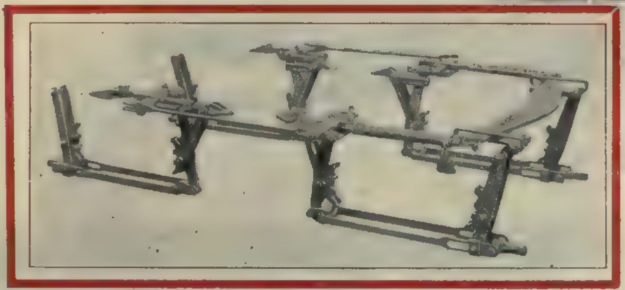
Modern Wheels for Modern Cars



American Multiple Unit Clasp Brake

Speedier Service Schedules demand QUICK RETARDATION!

American Multiple Unit Clasp Brakes on new Electrified Train of Chicago, South Shore and South Bend Railroad.



Time is an important factor in modern suburban and street railway service. Obtaining higher rates of retardation is one way of gaining time and keeping faster schedules. It depends on your brakes.

American Multiple Unit Clasp Brakes balance the forces in the truck and double the friction area of the Brake Shoes. American Multiple Unit Clasp Brakes are designed and manufactured on a sound engineering basis to produce short, smooth stops that modern service demands.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

Modern Brakes for Modern Cars

Philadelphia Rapid Transit Co.

They find
on

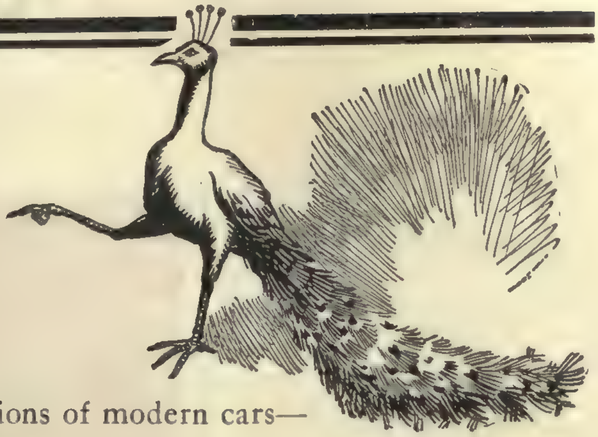
Booth
No. 271-A
AERA Convention

Grand Rapids Railway Co.

Brooklyn City Railroad Co.

Pittsburgh Railways Co.

it pays
modern cars!



Look over the specifications of recent installations of modern cars—all types—and almost invariably you will find

Peacock Staffless Brakes

included as part of the equipment.

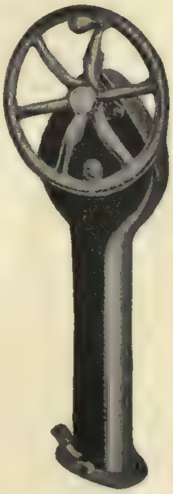
In practice, test and experience, Peacock Brakes have proved their merit beyond all argument or doubt. They pay for themselves.

Correctly constructed, of properly selected materials, Peacock Brakes involve practically no expense for repairs and replacements. Our engineers have specialized on the design of hand-brakes and they have considered the problem from all angles.

The Peacock Staffless brake is designed to occupy minimum platform space as it projects only six inches into the vestibule from the dash. Motormen like them because they are easy to understand, simple to operate and always dependable.

The Peacock Staffless Brake is at least three times as powerful as any ordinary type hand brake and provides ample space to wind up all the chain without jamming or binding. Excess of slack cannot put it out of commission.

Write for full details or visit our exhibit at the AERA Convention.



Peacock Staffless Brakes

NATIONAL BRAKE COMPANY, Inc.

890 Ellicott Square, Buffalo, New York

Canadian Representatives: Lyman Tube Supply Co., Ltd., Montreal, Canada.

Montreal Tramways Co.

We Want to Discuss

Our Light House Trade Mark —Symbol of Productive Work in Transportation Advertising

Visit
BOOTH
148-150
Cleveland

Public Relations Work With You

in Cleveland

NOT only to serve well but to "*sell* well while you serve" is as vital to the growth of transportation as to any other business in the world. Yet transportation is probably the only business which does not employ trained salesmen and a special sales department to increase its business volume.

In no other industry do men responsible for the production of a service attempt to sell this service themselves. They know that special training and ability are as necessary to such effort as they are necessary in the shop or in any other specialized department.

On some properties, of course, these facts have long ago been recognized. They have organized departments staffed by sales and advertising experts and these efforts, in most instances, have been marked by notable success.

Such instances, however, have been all too few and this, perhaps, is principally because so few men are available for the purpose. There are by no means enough experts to go 'round. Clearly, therefore, there is need for a commercial organization able to step in, taking up the study of conditions on a railway property, and developing a practical public relations program while, at one and the same time, training company men and organizing a special department which, a little later, should be able to carry on this work without further outside help.

We have, therefore, formed an organization of this character and feel that we are qualified to conduct your public relations work for the following reasons:

1. We have gained valuable sales and advertising experience through more than twelve years of sales and advertising activity in practically all of the principal branches of industry.
2. We have specialized in transportation advertising, thereby gaining a knowledge of transportation problems, methods and equipment.
3. We have added to our staff and retained as counsel a number of the individuals who have personally conducted the most successful public relations work of recent years.

With this experience and personnel, we are ready to undertake public relations work for the railway operator. We hope to have the pleasure of discussing this subject with you at the A.E.R.A. Convention, Cleveland —Booth 148-150.

Doyle, Kitchen & McCormick, Inc.
2 WEST 45th STREET, NEW YORK
An Advertising Agency

NOTHING SO VIVIDLY DEMONSTRATES THE GENERAL USEFULNESS

of the Differential Car as Repeat Orders

The Differential Car, once in your service, will suggest itself as a time and labor saver in many operations not previously considered. The result, naturally, is REPEAT ORDERS.

THE FOLLOWING COMPANIES HAVE REPEATED ON DIFFERENTIAL ELECTRIC DUMP CARS:
Having Given Us the Number of Orders Set Opposite Their Names

Cleveland Railway Company	5 Times
Steubenville, East Liverpool and Beaver Valley Traction Company	3 Times
The Milwaukee Electric Railway & Light Company	4 Times
New York State Railways	3 Times
East St. Louis and Suburban Railway Company	3 Times
Reading Transit and Light Company	3 Times
City of Detroit	3 Times
Dallas Street Railway Company	3 Times
Boston Elevated Railway Company	3 Times
Pittsburgh Railways	3 Times
H. L. Doherty Properties of Toledo	3 Times
Toronto Transportation Commission	Twice
New Orleans Public Service, Inc.	3 Times
Northern Ohio Power and Light Company	Twice
United Railways and Electric Company of Baltimore	Twice
United Railways Company of St. Louis	Twice
Cincinnati Street Railways	3 Times
Wheeling Traction Company	Twice
Kansas City Railways Company	Twice
Birmingham Electric Company	Twice
Market Street Railway Company	Twice
Indiana Service Corporation	Twice
Key System Transit Company	Twice
Schenectady Railways Company	Twice

58 Railway Properties have bought a total of 300 Differentials

COME TO SEE OUR EXHIBIT

In addition to the famous Differential Electric Dump Car we will show

THE CLARK CONCRETE BREAKER.
THE DIFFERENTIAL CAR WHEEL TRUCK AND TRACTOR.
THE DIFFERENTIAL ELECTRIC LOCOMOTIVE CRANE CAR.
THE DIFFERENTIAL 3-WAY DUMP BODY FOR MOTOR TRUCKS.

Dumps to both sides and to the rear.
Simplified hoist.

THE
DIFFERENTIAL
STEEL CAR COMPANY
FINDLAY, OHIO

Track-Roadway and Line Material

ADVERTISERS IN THIS SECTION

American Brass Co.
American Creosoting Co.
American Electrical Works
American Steel & Wire Co.
Anaconda Copper Mining Co.
Anderson Mfg. Co., A. & J. M.

Barbour-Stockwell Co.
Bates Expanded Steel Truss Co.
Bell Lumber Co.
Bethlehem Steel Co.
Buda Co.

Clark-Williams Eng. Co., Inc.

Dayton Mechanical Tie Co.

Electric Railway Equipment Co.
Electric Railway Improvement Co.

Foster Co., L. B.
Hubbard & Co.

Ingersoll-Rand Co.
International Creosoting & Constr. Co.

Locke Insulator Corp.
Lorain Steel Co.

McCardell & Co., J. R.
Metal & Thermit Corp.

Nachod & United States Signal Co.
Naugle Pole & Tie Co.

Okonite Co., The

Rail Joint Co.
Ramapo-Ajax Corp.
Roebling's Sons Co., John A.
Roller-Smith Co.
Rome Wire Co.
Russell, Burdsall & Ward Bolt & Nut Co.

Standard Underground Cable Co.
Sullivan Machinery Co.

Una Welding & Bonding Co.

Wharton, Jr. & Co., Wm.
Wood Co., Chas. N.

LASTING strength is an outstanding feature of ***International*** Creosoted Pine Poles. There is no gradual decrease in strength at the ground line due to decay, neither are the poles weakened by attacks from woodpeckers, insects or white ants. Years after installation these poles are as strong as when first put into the ground.

This great permanent strength gives greatest security to linemen, and to line materials, and makes the line stand up against the unusual strains caused by high winds and ice storms.

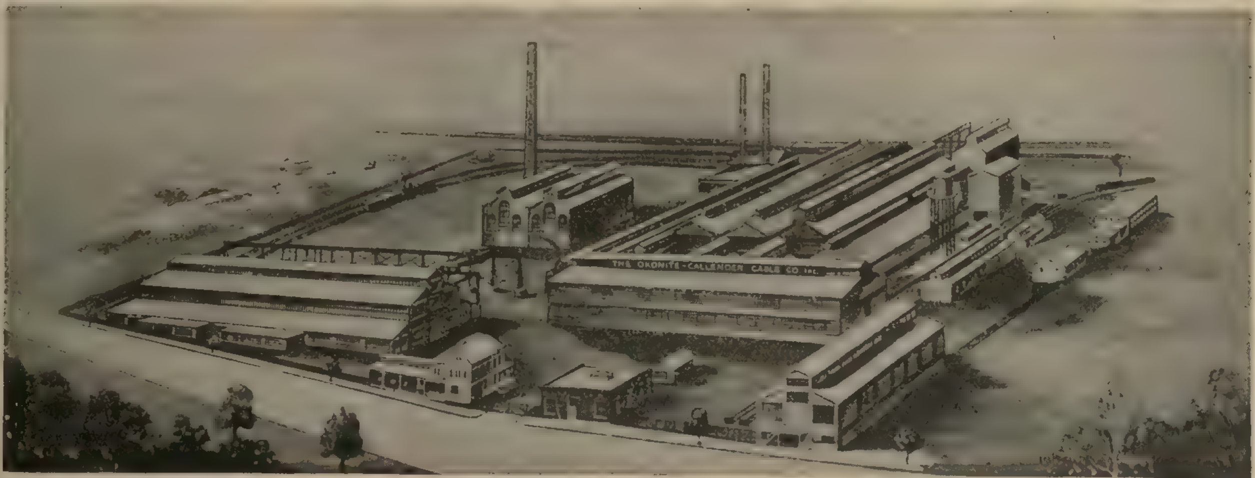
Guy wires do not cut into the timber and all hardware holds firmer. This firm hold secures the circuits and makes inspection and climbing safer and easier for the linemen.

The illustration shows International Poles in Florence, South Carolina, in service of the Carolina Power & Light Co.

International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont

PLANTS of
THE OKONITE COMPANY
AND
THE OKONITE-CALLENDER CABLE CO. INC.

THE OKONITE COMPANY, PASSAIC, N. J.


THE OKONITE-CALLENDER CABLE CO. INC.

THE OKONITE-CALLENDER CABLE CO., INC., PATERSON, N. J.

OKONITE PRODUCTS

Okonite Insulated Wires & Cables · Varnished Cambric Cables · Okonite Insulating Tape
Okonite Cement · Manson & Dundee Friction Tapes · Okocord · Okoloom

OKONITE-CALLENDER PRODUCTS

Impregnated Paper Cables · Super-Tension Cables · Splicing Materials

Our Handbook "Insulated Wire & Cable" and other Publications on Request

SALES OFFICES:

New York · Chicago · Pittsburgh · St. Louis · Atlanta · Birmingham · San Francisco · Los Angeles · Seattle

Pettingell-Andrews Co., Boston, Mass. Novelty Electric Co., Phila., Pa.
F. D. Lawrence Electric Co., Cincinnati, O.
Canadian Representatives: Engineering Materials Limited, Montreal
Cuban Representatives: Victor G. Mendoza Co., Havana

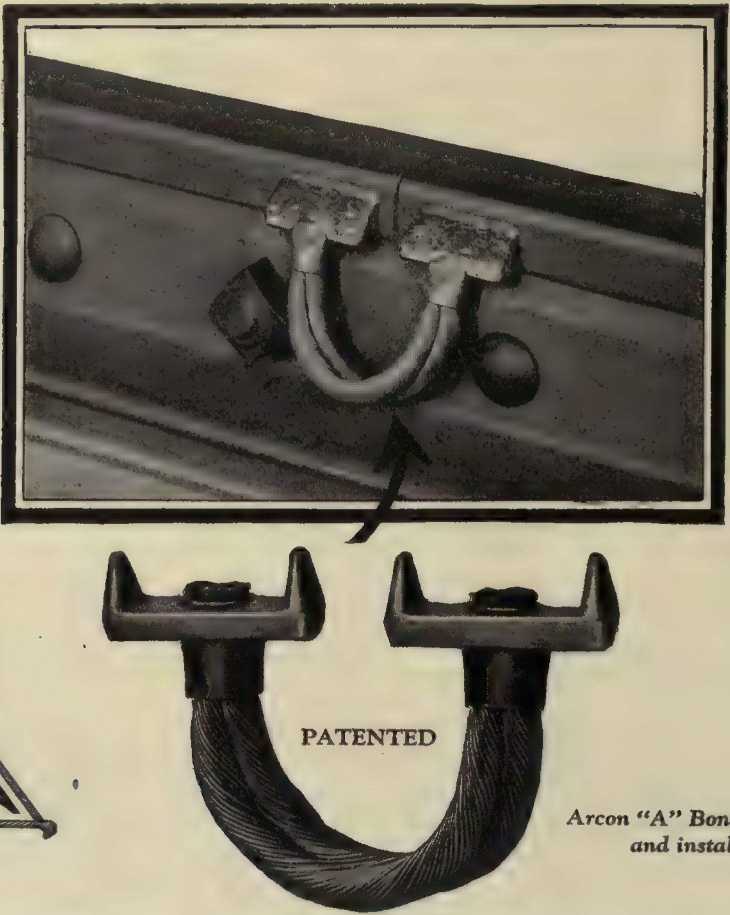
OKONITE

OKONITE-CALLENDER

American Steel & Wire Company's

ARCON RAIL BONDS

Trade Mark Registered



Our exhibit spaces at the Cleveland Convention will be No. 253 and 254.

Arcon "A" Bond in detail and installed

A NEW principle of design is embodied in Arcon Rail Bonds. *This is the open terminal.*

The open terminal has many distinct advantages. All terminals provide for *easy* arc manipulation. The end of the copper conductor is approximately one-eighth of an inch from the rail, and located in an open space which insures perfect welding of the copper wires. The sloping surface of the terminal after welding is a novel and important feature in arcweld bonds.

Be convinced by a practical demonstration which we will gladly give you at your convenience.

Prices and literature mailed upon request.

SALES OFFICES

CHICAGO...208 So. La Salle Street
CLEVELAND.. Rockefeller Building
DETROIT......Foot of First Street
CINCINNATI. Union Trust Building
MINNEAPOLIS—ST. PAUL.....
Merchants Nat'l Bk. Bldg., St. Paul

ST. LOUIS.......506 Olive Street
KANSAS CITY..417 Grand Avenue
OKLAHOMA CITY..........
..........First Nat'l Bank Bldg.
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MEMPHIS..................
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NEW YORK.....30 Church Street
BOSTON......185 Franklin Street
PITTSBURGH......Frick Building
PHILADELPHIA..Widener Building
ATLANTA.....101 Marietta Street

WORCESTER.....94 Grove Street
BALTIMORE..32 So. Charles Street
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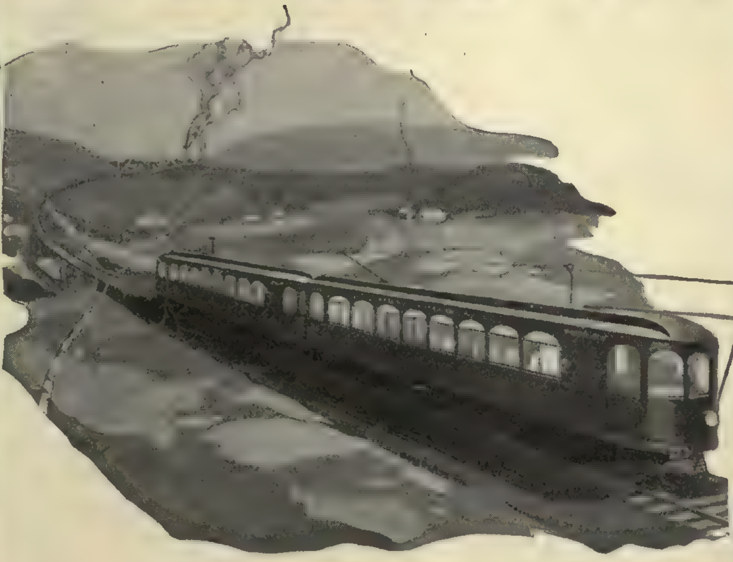
DALLAS......Praetorian Building
DENVER..First National Bank Bldg.
SALT LAKE CITY. Walker Bk. Bldg.

UNITED STATES STEEL PRODUCTS COMPANY, San Francisco, Los Angeles, Portland, Seattle

EMPIRE BOLTS & NUTS



Tangible Economies

A NUT is not an expedient. It is a vital part of construction. Know what it has to do, and you will buy with care.

Empire cold punched steel nuts save the frequent replacements that run up the cost of maintenance Free from the burrs and scales that bring such early wear to hot pressed nuts, they give a lifetime of faithful service.

Theirs is the only economy you can afford to consider—for it is real and tangible. Your maintenance bills grow less when you use them. Nothing else matters.

Empire cold punched steel nuts are made in all sizes and styles for railway service. Write for catalog and prices.

BOLTS EMPIRE NUTS-RIVETS

RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
PORT CHESTER, N.Y.

Branch Office: Straus Building CHICAGO
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Strimple & Gillette 169 Jackson Street SEATTLE
Maydwell & Hartzell, Inc. 158-168 Eleventh Street SAN FRANCISCO

Makers of Bolts, Nuts and Rivets Since 1845

Can You Cut Your Taxes In Half?

RAILWAY executives recognize taxes as a necessary but very burdensome item of expense. A plan to save one-half or even one-tenth of this amount would meet a most cordial reception.

The use of AmCreCo creosoted ties does not directly affect taxes. It does produce an economy, however, which may be sufficient to offset a considerable part of this inescapable expense. The saving possible through the adoption of creosoted ties varies widely, and, of course, the amount of taxes paid also varies so that no general ratio can be stated. But it is no exaggeration to say that there are roads on which the universal use of AmCreCo ties would save enough to pay one-half the taxes.

This saving in tie maintenance cost is easily demonstrated by actual experience. The possibility of tax reduction is so remote as to be scarcely worth considering. Why not grasp the bird in the hand, rather than wait for the one in the bush?

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY
INCORPORATED

AMCRECO
LOWRY PROCESS
CREOSOTED WOOD

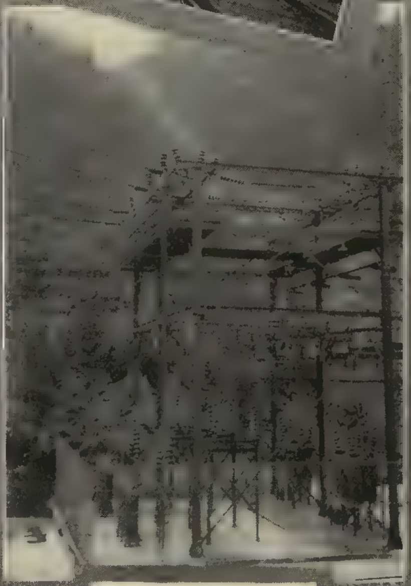
GEORGIA CREOSOTING COMPANY
INCORPORATED

LOUISVILLE ~ KENTUCKY
SALES OFFICES
350 MADISON AVE. NEW YORK CITY ~ 401 W. MAIN ST. LOUISVILLE, KY.
BOGALUSA LA. BRUNSWICK, GA

AMCRECO
Creosoted Southern Yellow Pine
POLES

Are Strong, Straight, Uniformly Tapered; Resist Decay, Fire, Insects and Birds; are treated with pure creosote oil by an organization of specialists backed by years of experience.

The Norfolk and Western Railroad Electrification



ONE of the interesting railway electrifications of the country, which well represents the progress now being made in rapid transit service, is the Norfolk and Western.

The left hand illustration shows a typical curve on the main lines. One type of insulator is required at the bridge to carry the 11,000 volt messenger. Another type is pulling horizontally across the trolley; and a third is at the top of the poles, carrying the 88,000 volt transmission.

The view at the right shows a supporting bridge at the entrance to one of the yards, with insulators inclined in various directions to care for the spider-web of wires placed over the various tracks within the yard.

The lower picture shows one end of the outdoor switching station near the western end of the electrification. Several types of insulators are in use here to dead-end the cables, carry the switches and the feeders and to insulate other equipment.

The Locke Company has furnished the insulator equipment for many notable electrifications, and is in a position to give advice and suggestion on both standard and special designs for all classes of railway work.

LOCKE

R = ∞

LOCKE INSULATOR CORPORATION

BALTIMORE, MD. **Factories at Victor, N. Y., and Baltimore, Md.**

Sales Offices:

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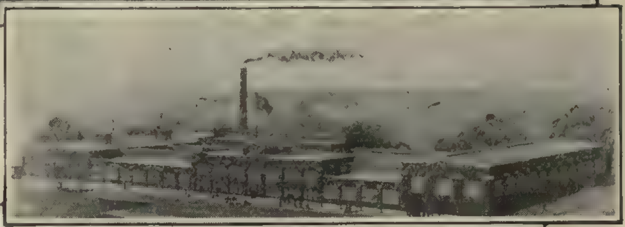
Seattle, Wash.
570 First Ave., South

Export Agents: International General Elec. Co., Schenectady, N. Y.

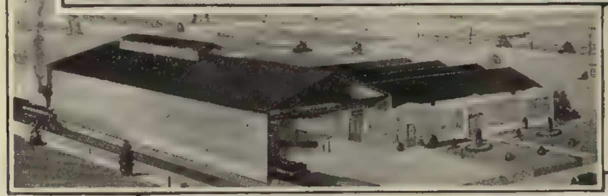
Established **LOCKE** 1894

PORCELAIN

The Hubbard Pittsburgh Plant Started in 1843.



The Hubbard Chicago Plant Started in 1920.



The Hubbard Niles Plant Started in 1923.

Hubbard and Company's four modern factories always at your service

The Hubbard Oakland Plant Started in 1924.

Just as the electric railway industry has progressed from year to year, so have Hubbard designs and manufacturing methods. In fact Hubbard has always been a pioneer in every development of new pole-line hardware. Today, Hubbard heads the list for the most complete and most up-to-date equipment.

Manufactured by four modern plants in Pennsylvania, Illinois, Ohio and California and designed by expert engineers of wide experience, Hubbard Standard Pole Line Hardware and Peirce Construction Specialties meet every requirement of the Electric Railway Industry.

You are assured of prompt service at all times by the 124 completely stocked jobbers located at central points throughout the country.

For excellence of quality and economy of time select all your pole-line hardware from the concentrated buying guide of the Electric Railway Industry — THE HUBBARD CATALOG.

Send today for your copy!

THE HARDWARE makes the line— HUBBARD *Hubbard makes THE HARDWARE*

Hubbard and COMPANY

PITTSBURGH · OAKLAND, CAL. · CHICAGO

You Are Cordially Invited

ANACONDA
from mine to consumer

The high conductivity and uniform quality of Anaconda Metals are the result of the coordinated supervision by a single organization of every process from ore to finished product.

Six wire mills offer a coast to coast service unequalled for promptness and dependability.

To visit the Anaconda Exhibit in Booth No. 206 at the A. E. R. A. Convention in Cleveland.

Our representatives in charge will be ready to give you the benefit of Anaconda's experience in the manufacture of copper, brass and bronze products for electric railway uses.

A special engineering service is provided to assist in obtaining the most efficient and economical results from the complete line of Anaconda Copper and Copper Alloys.

ANACONDA COPPER MINING CO.—THE AMERICAN BRASS COMPANY

Rod, Wire and Cable Products

General Offices: 25 Broadway, New York — Chicago Office: 111 W. Washington St.

ANACONDA COPPER

BRASS ANACONDA from mine to consumer BRONZE

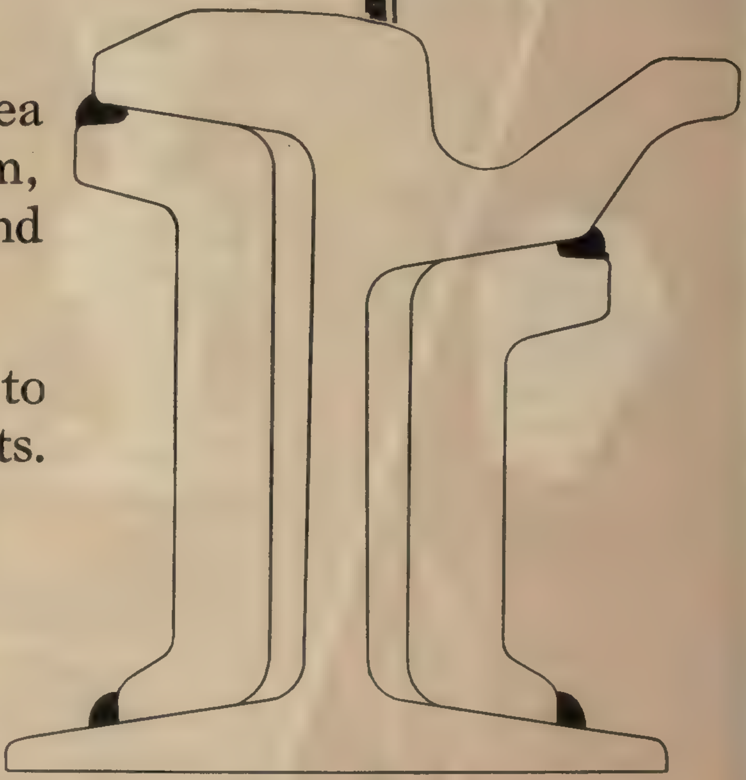
"WELD PLATES"

The bar-weld rail joint thrice modernized

1. Generous grooves along the upper edges to hold plenty of welding metal.

2. Amply wide contact area at both top and bottom, assuring great rigidity and good support.

3. Modification of design to permit the use of short bolts.



Successful installations now in service, under widely differing track conditions, demonstrate the efficiency and economy of the "Weld Plate" System. "Weld Plate" units are rolled especially for use with modern electric welding equipment. Their design and composition assure a first class job with a minimum of labor and time.

Performance data and details of design furnished gladly upon request.

The Rail Joint Company
165 Broadway, New York, N. Y.

BROOKLYN
MANHATTAN
TRANSIT

ACCEPTED PRACTICE

GRAND
RAPIDS
RAILWAY

PHILADELPHIA
RAPID
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CHICAGO
SURFACE
LINES

by the electric railways you recognize as having modernized!

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ILLINOIS TRACTION SYSTEM
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INDIANA SERVICE CORP.
CUMBERLAND COUNTY POWER & LIGHT Co. (MAINE)
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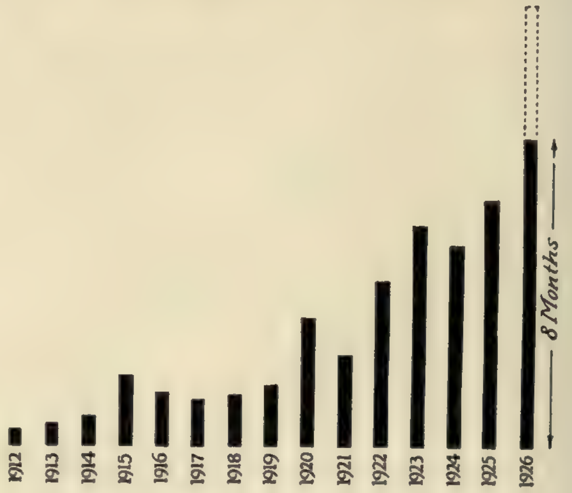
THERMIT



Relative numbers of Thermit Welds installed

THERMIT welding has come into its own! Today the majority of America's electric railways use it. Especially those which have been most conspicuous in adopting modernization programs. This year more Thermit welds were made in the first eight months, than in any previous entire year. The chart shows that the Thermit insert rail weld has made steady progress since it was first put on the market in 1912, while it was slightly retarded during the

THIRD AVENUE (NEW YORK)

TWIN CITY RAPID TRANSIT

INDIANAPOLIS STREET RAILWAY CO.

WELDING

New Users of Thermit in 1926

The following list of roads includes several of the largest in the Country. At one time or another they have tried nearly every known type of rail joint and every method of welding. This year, for the first time, they have turned to the use of Thermit welding on a large scale.

Binghamton Railway Company
Chicago South Bend & Northern Indiana Ry.
Cincinnati Street Railway Company
Department of St. Rys.—City of Detroit
Cincinnati, Hamilton & Dayton Railway
Danville Traction & Power Company
Fonda, Johnstown & Gloversville R.R.
Hydro-Electric Railways (Canada)
Jamestown Street Railway Co.
Michigan Railroad Company
Michigan Electric Railway Co.
Morris County Traction Co.
New York Railways Company
Philadelphia Rapid Transit Co.
Southern Indiana Gas & Elec. Company
Southern Pacific Company
Virginia Electric & Power Co.

war years and during the serious business depression of 1921, the demand for it since then has increased by leaps and bounds. Many Thermit welds, installed fourteen years ago, and under heavy traffic ever since, are still good. These welds are in Pittsburgh, New York, Boston and Milwaukee. Such service is what has brought about the general recognition of Thermit Welding as the *accepted* method of joining rails.

HYDRO ELECTRIC RAILWAYS (ONTARIO)

INTERSTATE PUBLIC SERVICE (IND.)

MILWAUKEE ELECTRIC RAILWAY & LIGHT Co

COMMUNITY TRACTION TOLEDO.

DETROIT DEPT OF STREET RAILWAYS

CINCINNATI STREET RAILWAY

TERRE HAUTE INDIANAPOLIS & EASTERN

UNITED RAILWAYS COMPANY (R.I.)

HOUSTON ELECTRIC (TEX)

ILLINOIS POWER AND LIGHT Co.

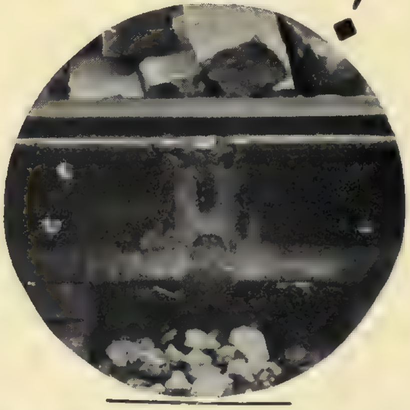
BANGOR HYDRO-ELEC CO. (MAINE)

READING TRANSIT CO.

BINGHAMPTON RAILWAY CO.

What is gained by using Thermit?

Ask any user!



SPRINGFIELD STREET RAILWAY (MASS)

BROOKLYN CITY R.R.

VIRGINIA ELECTRIC & POWER C.

CINCINNATI NEWPORT COVINGTON RAILWAY

Testimony from those who have bought and paid for a product is the most convincing testimony. Ask San Antonio! Ask Pittsburgh! Ask Third Avenue Railway! They've had Thermit joints in service for years.

Thermit users will tell you that Thermit joints last longer, require no maintenance, give a smoother riding rail surface, eliminate bonding and cost far less in the long run. It's time for every progressive railway to know about it.

A.E.R.A. Convention Exhibit Space 251-264-265

METAL & THERMIT CORPORATION
120 Broadway, New York, N. Y.
PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

The very foundation of improved service —tracks that are kept in A-1 condition

To keep modern cars and modern equipment out on the road earning dividends requires tracks that are always in first-class condition.

And the way to make track welds that will not crack, "cup" or deteriorate in service is *to forge the steel while it is still hot.*

The only processes which simultaneously weld and forge the rail joint are—

The two
LORAIN PROCESSES
of
Electric Welding

(Butt Weld and Bar Weld)

United States Bureau of Standards Repeated Impact Tests.
Butt-welds on Lorain Rail,
624,600 blows, 1,412,500 blows and 1,497,000 blows.
Lorain Solid Rail, 1,353,300 blows.
Bar-welds, 473,500 blows and 694,200 blows.

To get full particulars see our exhibit

SPACES 242-243-255-256-257

The Lorain Steel Company

General Offices: Johnstown, Penna.

Sales Offices:

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Chicago
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Pacific Coast Representative: United States Steel Products Company

Los Angeles
Portland
San Francisco
Seattle

Export Representative: United States Steel Products Company, New York, N. Y.

LORAIN

Special Trackwork—Girder Rails—Switches—Crossings—etc.,

I-R Type 20 Portable Air Compressor operating CC Paving Breakers

I-R Type 20 Electric-Driven Portable Air Compressor running 4—I-R Tie Tampers.

Speed up the job with I-R track tools

I-R Pneumatic Tools bring the two ends of the job closer together—the two ends of any job on which they are put to work.

How do they do this? Take the performance of I-R Paving Breakers for example. They take the life out of the concrete and not out of the men. A gang of laborers can easily break out three times as much concrete with Paving Breakers as they could by hand methods.

And as for I-R Pneumatic Tie Tampers—they will greatly speed up your trackwork program. They tamp much more solidly than ordinary hand devices and they require only one-third of the time to do the job. They "set" the ground pneumatically—you don't have to wait for nature to do it.

I-R Air Compressors and tools are ruggedly built—you can rely on them. They are backed by a company whose reputation is built up on that of its products.

If you will drop us a line, we will gladly mail you a copy of our 112-page book, "100 and 1 Ways to Save Money." We are sure that you will find many useful suggestions therein, and our engineers will go into the details with no obligation whatever to you.

Pneumatic Tie Tampers
Paving Breakers
Rail Drills
Grinders
Riveters
Chippers
Spike Drivers
Portable Compressors

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WHARTON

Special Trackwork

SWITCHES—FROGS—MATES—CROSSOVERS

As essentially a part of the modern program as new cars

The finest automobile will "ride rough" if the road is bad enough. And the best of new electric railway cars will still "clatter" and "jolt" over badly designed, or worn out, special work,—with the result that passengers are disappointed and a major purpose of the new service defeated.

That is why many of the roads most prominent in the progress of modernization have made more or less extensive installations of Wharton Special Trackwork. Past experience throughout the electric railway industry has shown that Wharton experience in design and construction together with the exclusive use of TISCO Manganese Steel, result in trackwork of most permanent smoothness under heavy traffic conditions.

You are cordially invited to confer with our engineers at Cleveland on any matters concerning standard or special track construction.

See our exhibit at Space 229

WILLIAM WHARTON JR. & CO., Inc.
Easton, Pa.

Sales Offices
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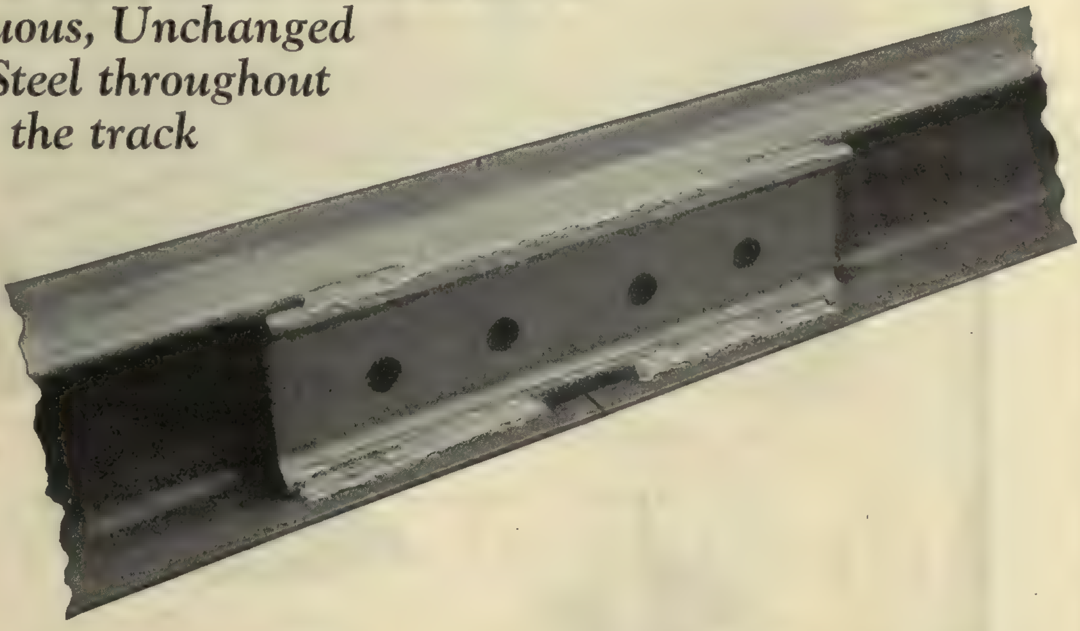
Modern Rail Joints *for* Modern Track

Continuous, Unchanged
Rail Steel throughout
the track



Continuous Rail

In the modern UNA Joint, with the rail ends under mutual compression, the gap between the rail ends is completely eliminated. The car wheels pass from rail to rail smoothly and silently with no pounding or cupping at the joint.

Unchanged Rail

Welded by the UNA Process the mechanical structure of the joint is maintained during the life of the rail. The UNA Welding process not only produces a strong weld free from welding stresses, with fine grained, heat-treated metal but also leaves the rail steel at the joint identical with the balance of the rail as it came from the mill.

With the gap eliminated, with the running surface of the rail at the joint unchanged, uneven wear, cupping and the resulting impact that destroys the joint is positively eliminated.

Economical, durable, easily installed in new or old track under all traffic conditions.

UNA
PRODUCTS

Rail Joints
Rail Bonds
Dynamotors
Welding Rod
On Display
at
Booths No. 201 A and 299
Cleveland Auditorium
A.E.R.A. Convention,
October 4-8

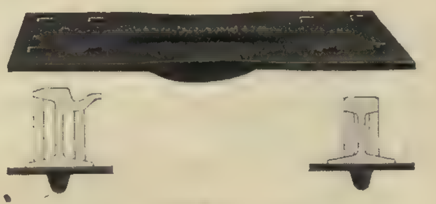
UNA WELDING AND BONDING COMPANY
Cleveland, Ohio

BETHLEHEM RAIL

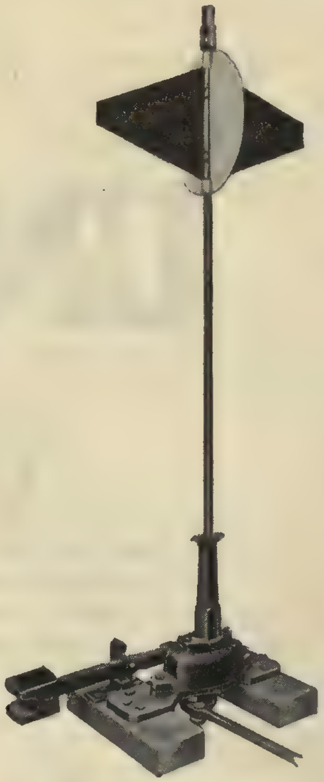
for Electri

Interior View of Track Layout Building, Steelton Plant, Steelton, Pa.

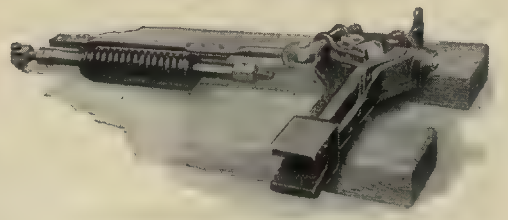
Abbot Base Plate



Center Rib Base Plate



New Century Switch Stand
Model 51-B



Parallel Throw Switch Stand
Model 1222
4¾-in. high

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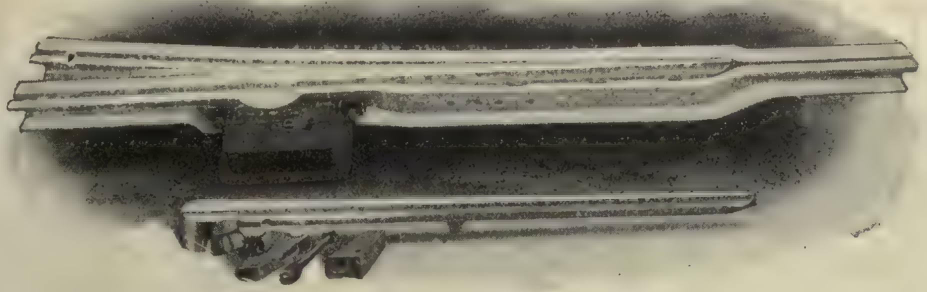
District Offices: New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo Cleveland Cincinnati Detroit Chicago St. Louis San Francisco Los Angeles Seattle Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, *Sole Exporter of our Commercial Products*

BETHLEHEM

WAY PRODUCTS

Railways



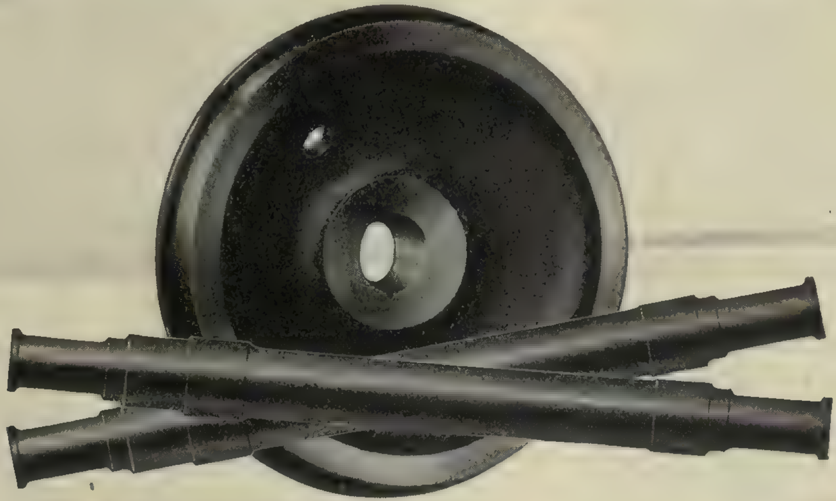
Solid Manganese Tongue Switch, Design 905

Bethlehem Electric Railway Products

Special Trackwork; Tee and Girder Rails; Special Splice Bars for Welding; Machine Fitted Joints; Abbott and Center Rib Base Plates; Tie Rods; Bolts; Pole Line Material; Rolled Steel Wheels and Forged Axles.

Catalog Sent on Request

Special Trackwork and Layouts



BETHLEHEM STEEL COMPANY *General Offices:* BETHLEHEM, PA.

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Bethlehem Steel Export Corporation, 25 Broadway, New York City, *Sole Exporter of our Commercial Products*

BETHLEHEM

NEW
RAILS
AND TRACK MATERIALS

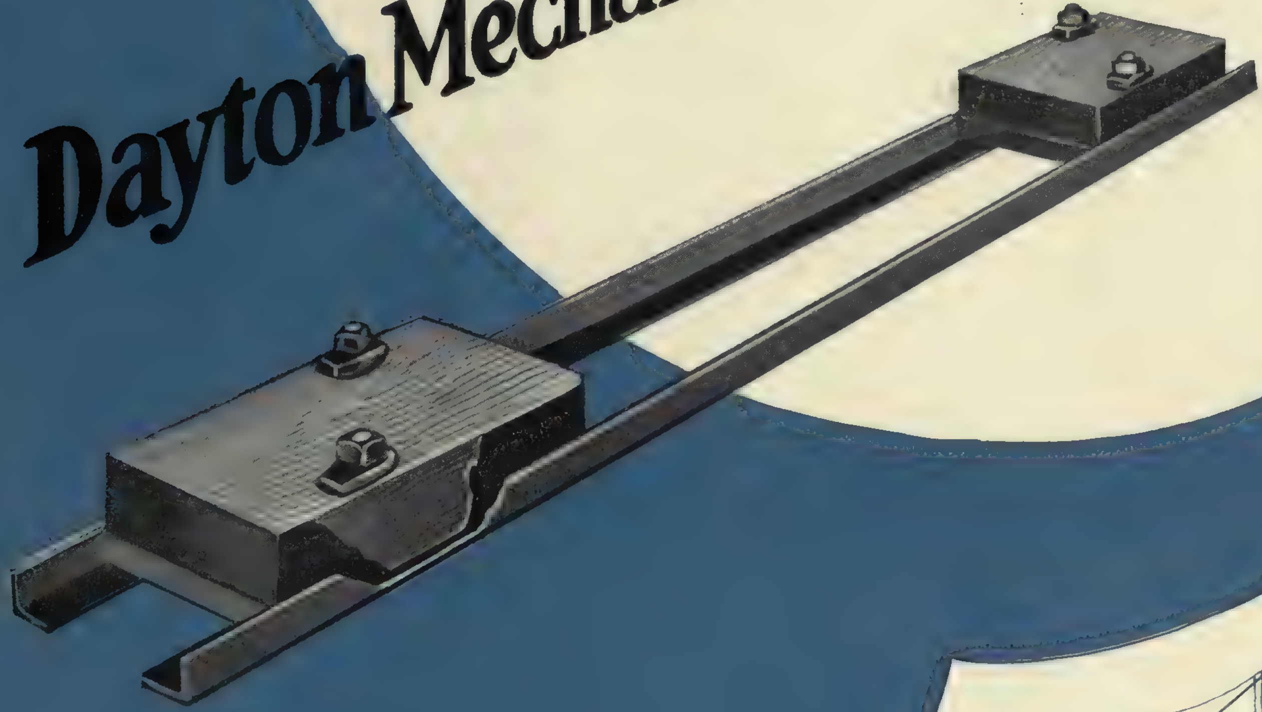
Foster Supplies regularly, New Steel Rails and Track Accessories for Complete Installations and for Repairs or Extensions, to many of the largest Electric Railways in this country—with complete satisfaction as to QUALITY, SERVICE and GUARANTEE.

"PRICES,"—well, just ask for them—"1 Ton or 1,000."

L·B·FOSTER COMPANY
PITTSBURGH · CHICAGO · NEW YORK

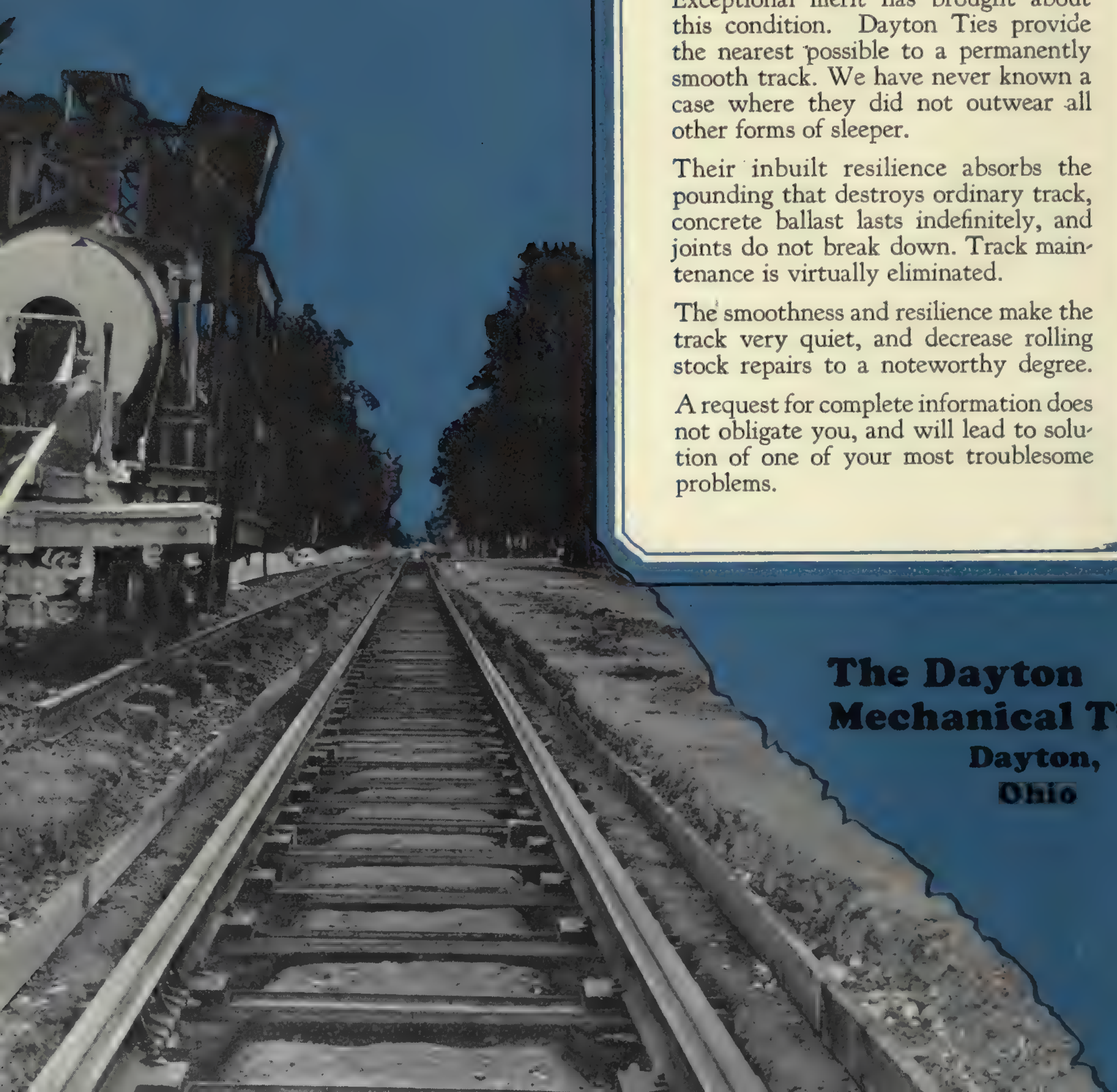
Internationally Appreciated

Dayton Mechanical Ties



ie Co.

Dayton Mechanical Ties Are Internationally Appreciated Because of Exceptional Merit



Dayton Mechanical Ties have expanded over the boundaries of the United States. Canadian and European business is rapidly growing.

Exceptional merit has brought about this condition. Dayton Ties provide the nearest possible to a permanently smooth track. We have never known a case where they did not outwear all other forms of sleeper.

Their inbuilt resilience absorbs the pounding that destroys ordinary track, concrete ballast lasts indefinitely, and joints do not break down. Track maintenance is virtually eliminated.

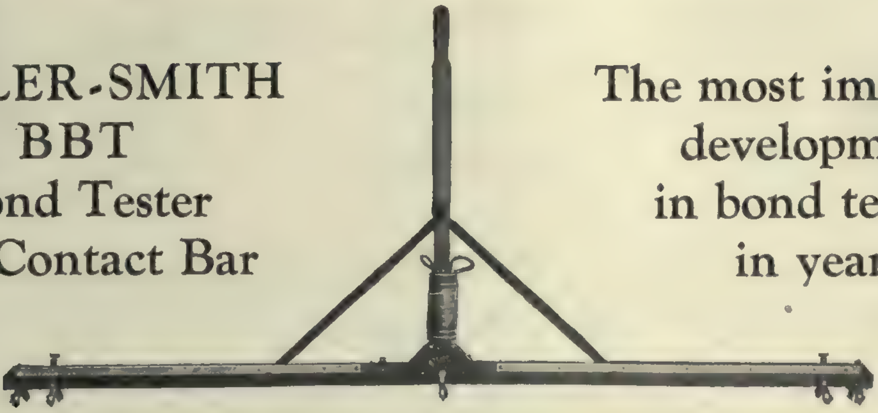
The smoothness and resilience make the track very quiet, and decrease rolling stock repairs to a noteworthy degree.

A request for complete information does not obligate you, and will lead to solution of one of your most troublesome problems.

The Dayton
Mechanical Tie Co.,
Dayton,
Ohio

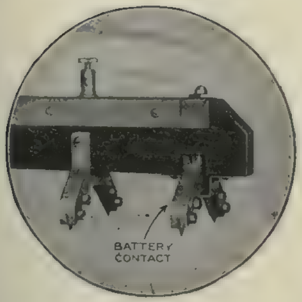
The PERFECT Bond Tester!

ROLLER-SMITH
BBT
Bond Tester
and Contact Bar



The most important
development
in bond testing
in years

Here is why:



This built-in No. 6 dry cell is *all* that is needed for rail current. No heavy storage battery or resistance required. No extra helper to carry them.

Contacts are supplied that will fit *any* rail head. They "bite" into the rail head and enable you to get perfect contact and clear, accurate readings.

The R-S Type BBT Bond Tester has over five times the sensitivity of the most sensitive bond tester heretofore made. It is a "one-man" outfit. The scale readings are direct in units of feet of rail. It is light, compact, rugged and dependable. It is "THE" perfect bond tester.

Every man who is *any* way interested in bond testing should know all about this new instrument. If you will fill in and forward the coupon below a copy of new Bulletin No. G-200 will be sent you promptly. Or, better still, get in touch with the R-S Office nearest you. There is one in every principal city.

"Over thirty years experience
is back of ROLLER-SMITH"

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Electrical Measuring and Protective Apparatus

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Service *Satisfaction*

Barbour-Stockwell Co.

"BSKO"

Specialties

The Public Wants It. The Carriers Need It.
We Furnish It.
Easy Riding - - - Long Life

Special Trackwork
of every description
for

STREET RAILWAYS

Constructions suitable for all requirements

Kerwin Portable Crossovers
Balkwill Articulated Manganese Steel Crossings
Wiswell Patent Improved Railroad Crossings

(Write for Particulars)

Expansion Rails for

Welded Track and Bridges

Girder Rail—"H-B" Type
Tee Rail—"E-M" Type

(Detailed Information on Request)

Quality *Dependability*

BARBOUR-STOCKWELL CO.
205 Broadway, (*Est. 1858*) Cambridge, Mass.

"South Shore" *an outstanding example of modern methods, uses* Bates "Semi-Fabricated" Structures

The Chicago, South Shore and South Bend Ry., which has recently undertaken an extensive program of modernization, is a noteworthy example of the beneficial results which always follow such activity. In addition to improvements in rolling stock, the road bed and overhead structures have been brought up to a modern high standard. Bates galvanized supporting structures of the "Semi-Fabricated" type, utilizing Bates "double expanded" members are an important feature of the new overhead construction. Strength, simplicity of design, cheap maintenance and erection, and appearance are features of first importance in these structures.

A Bates proposal on your supporting structure installations, whether railway structures, poles or towers, will prove of interest to you.

INTERNATIONAL
STANDARD ELECTRIC CORP.
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SAMUEL BROWN, LTD., *New Zealand*
JOST ENGINEERING CO., LTD., *India*

BATES-TRUSS
Expanded
MADE ONLY BY

Bates Expanded Steel Truss Co.
Sales, Engineering and Executive Offices
EAST CHICAGO, INDIANA

On the Boston Elevated Railway System—

Trenton Tower Outfits

help reduce maintenance costs

The Boston Elevated Railway System has reduced trolley wire breaks 43 per cent, cut down interruptions to service and reduced line maintenance costs. Overhead wires are inspected regularly on the basis of number of wheel passes, rather than the mere passage of time.

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TRENTON TOWERS are standard equipment on the principal electric railways of the Country.

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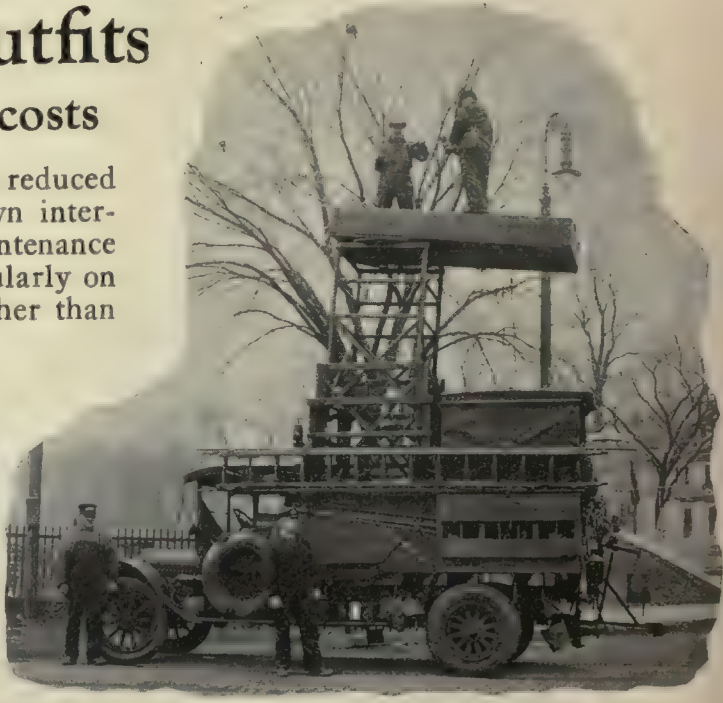

Line Crew and Tower Truck of Boston Elevated Railway Engaged on Periodic Ear Renewal Work.

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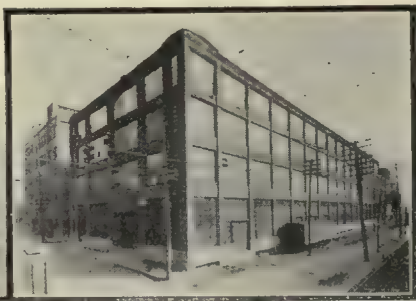

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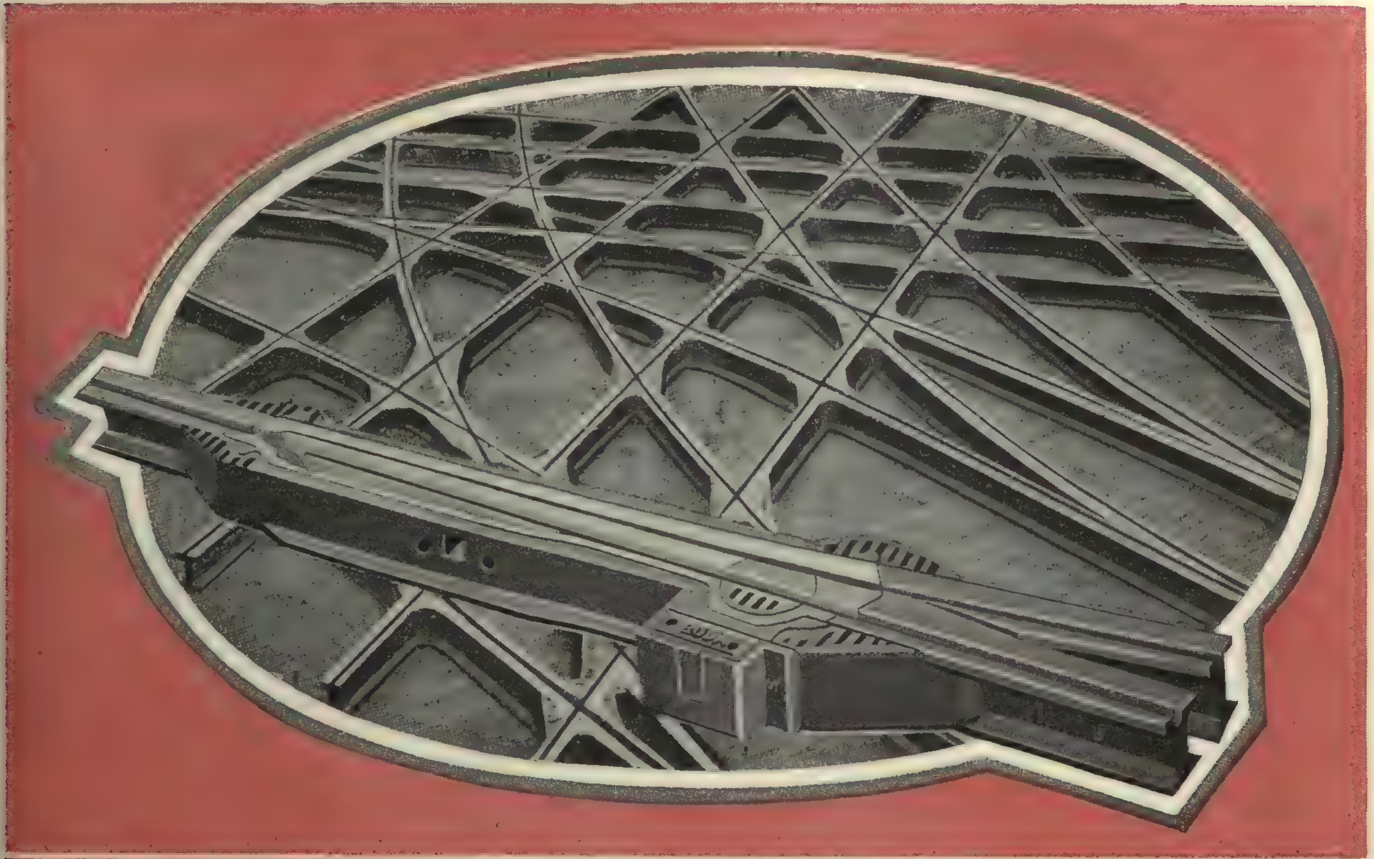
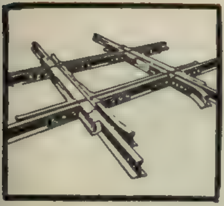
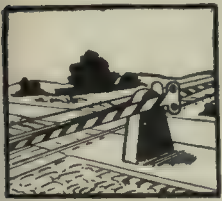




Railroad Crossing



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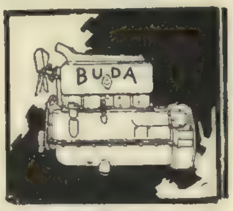

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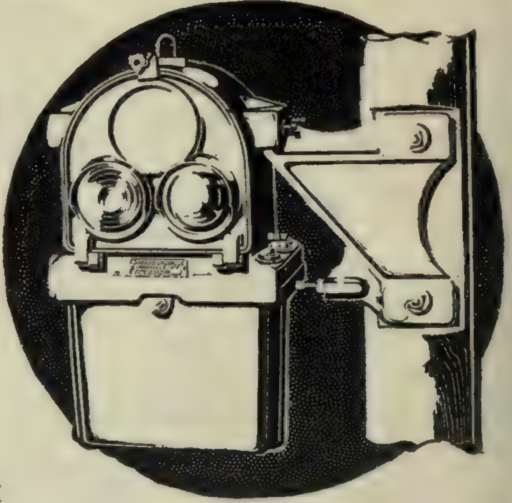

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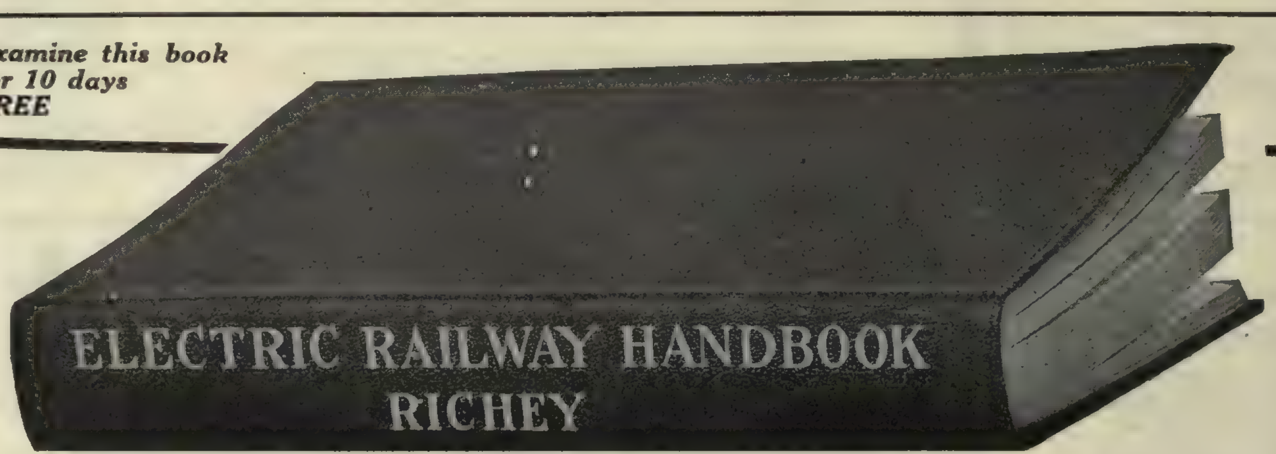

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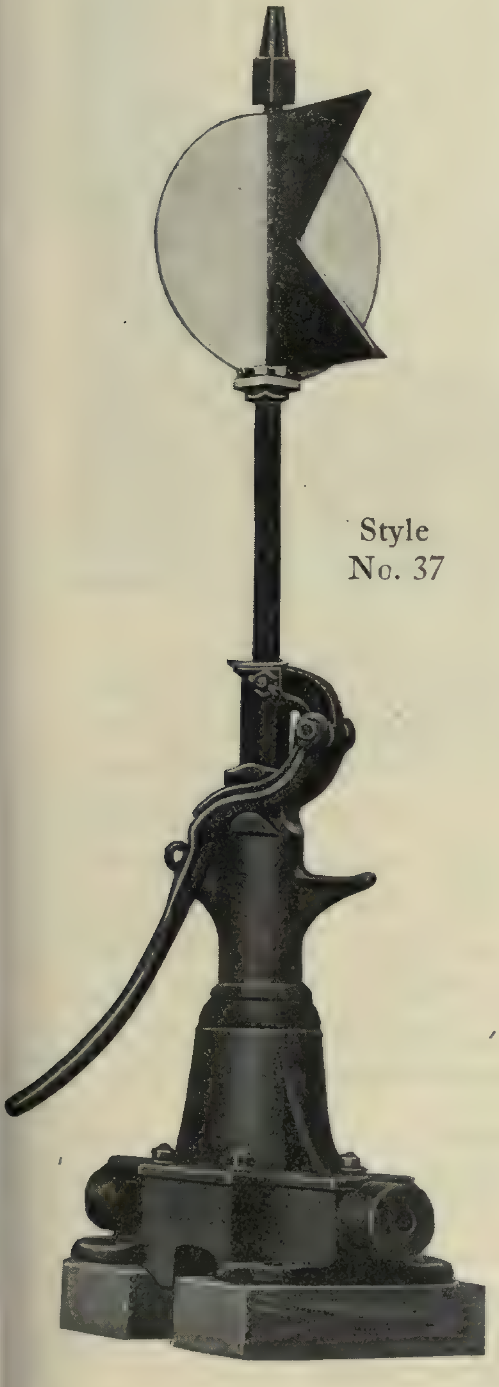

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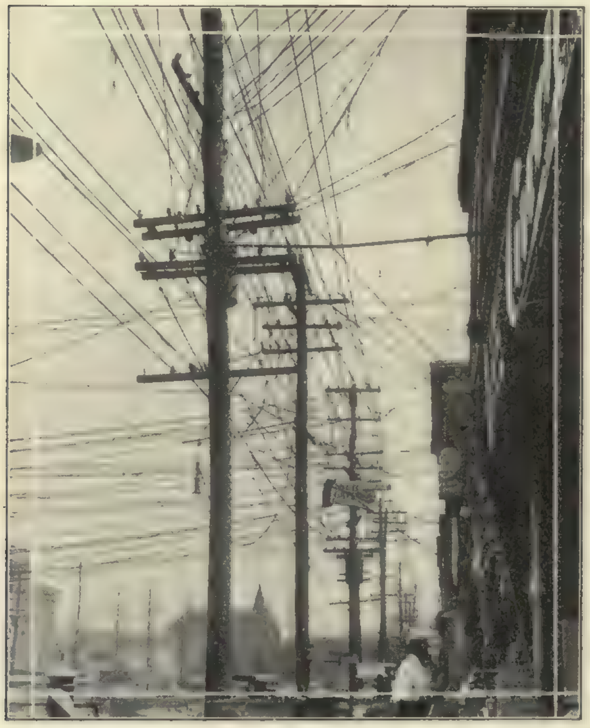

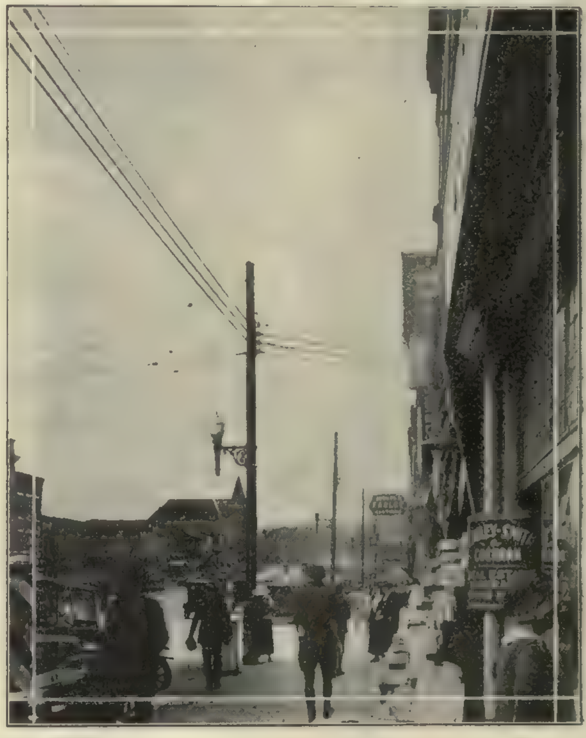

In carrying out the modernization program, do not overlook the overhead lines! Look at the above pictures of the overhead lines in Montgomery, Alabama, before and after modernization. They clearly depict the reasons why modern methods of overhead construction create better public relations and good will! This wonderful transformation was accomplished through the use of

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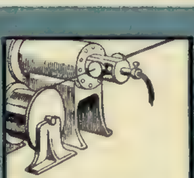
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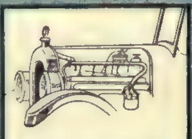
Telephone Wires and Cables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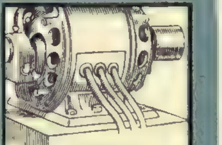
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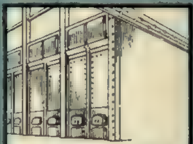
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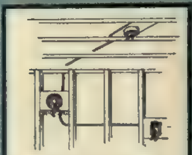
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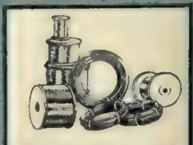
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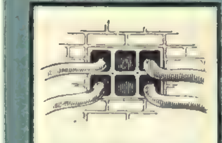
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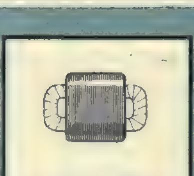
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Mining Machine Cables

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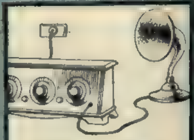
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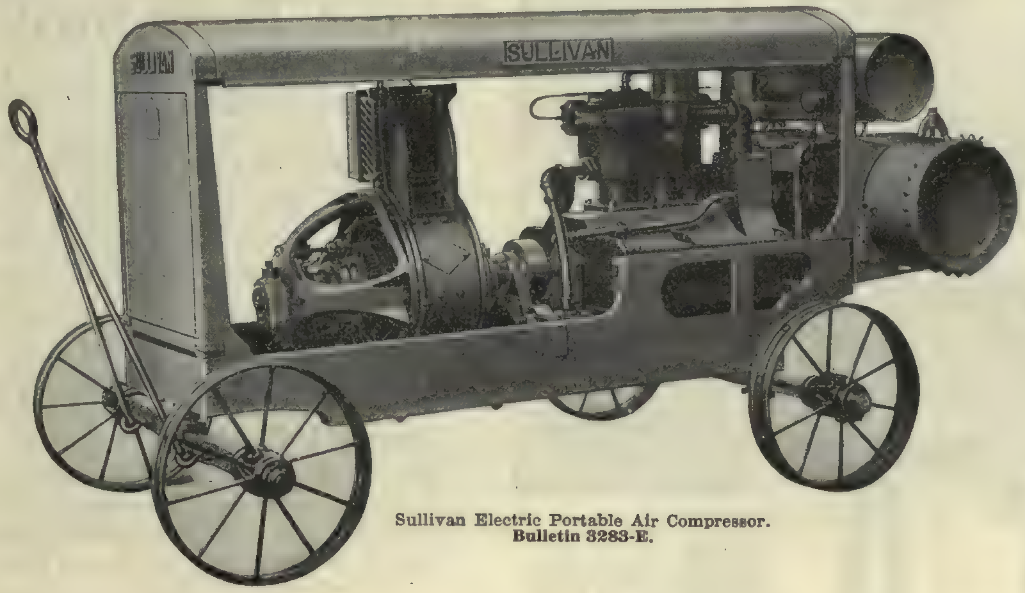
See This Compressor at Cleveland



Sullivan Electric Portable Air Compressor.
Bulletin 3283-E.

Concrete Breaker
Bulletin 3281-I

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Rotator Rock Drill
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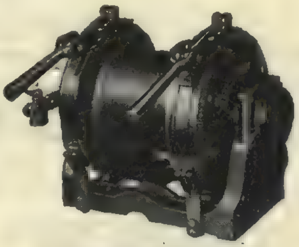
You'll also see a Sullivan Turbinair Portable Hoist at work and Sullivan Busters, Rotator Rock Drills and Clay Spaders, all standard types, in use the country over. Try them yourself at our booth, then put them in your estimates for your next job.

Clay Spader
Bulletin 3281-J



Turbinair Portable Hoist
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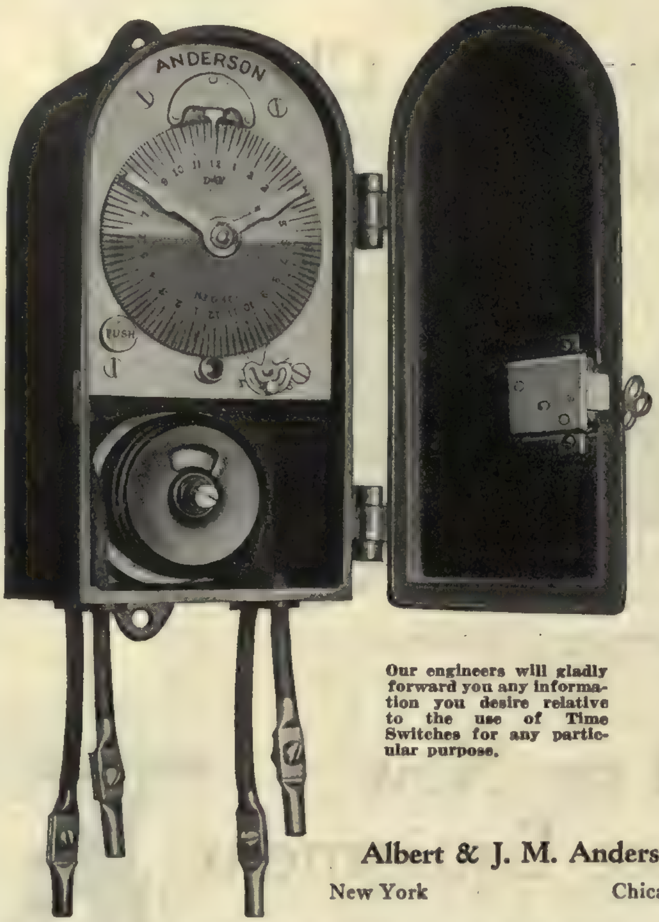

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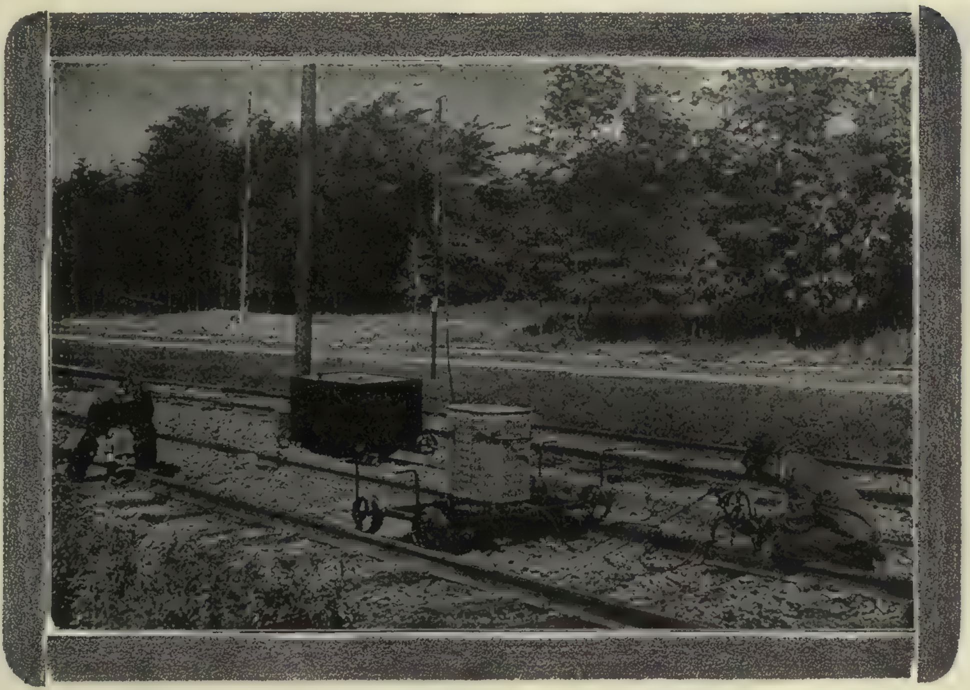

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We thoroughly appreciate that the problem of bonding represents one of the most difficult problems confronting the electric railway executive and engineer.

Brazed bonds have been put to severe tests during the past 25 years on the largest electric railways in the country. They have successfully met the varied requirements.

Much of the expense of rail bonding has been due to the interruption of traffic during the bonding operation. Delayed schedules cost money more ways than one.

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Electric Railway Improvement Company

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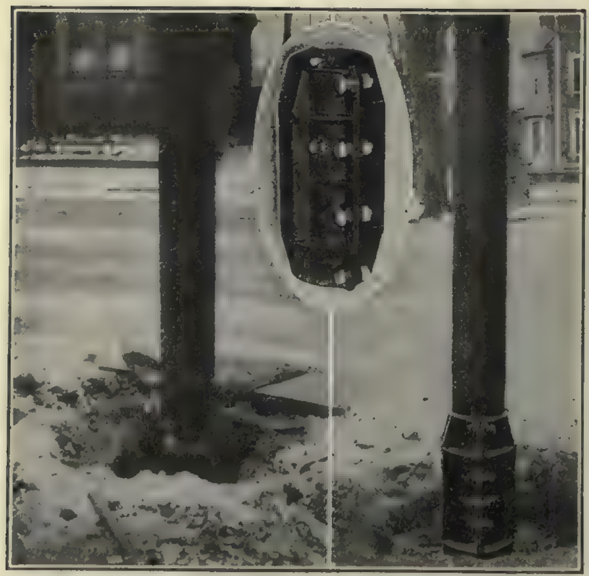

Showing how years were added to the life of this corroded iron pole with a Clark-Williams Tabular Iron Pole Reinforcing Clamp.

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Showing how a Clark-Williams Pole Mount renewed the life of this wood pole, rotted at the ground level.

Years added to pole life by using Clark-Williams Pole Mounts and Reinforcing Clamps

When iron and steel poles become corroded at the joints and at the ground level it is costly work to renew them. But it is a simple and inexpensive job to renew their life for many years by the use of Clark-Williams Tubular Reinforcing Clamps.

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Let us give you full data about how you can add 20 to 30 years' life to your iron or wood poles. Installation estimates on request.

When at A.E.R.A. Convention, Cleveland, October 4th to 8th, STOP AT SPACES 269-282

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The NEW HAVEN & SHORE LINE RAILWAY, with up-to-date cars, the operating cost is 19.95 cents per car-mile.

Equipment used:

- 4—25 h.p. GE-264-A Motors
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- G-E Type CP-27 Compressors

Through specific figures,

The NORTHAMPTON TRANSIT COMPANY, although faced with a staggering burden of mounting costs, succeeded with large modern light-weight interurbans in cutting operating expenses to 26.5 cents per car-mile.

Equipment used:

- 4—35 h.p. GE-265-A Motors
- G-E Type K-35 Control
- G-E Air Brakes
- G-E Type CP-27B Compressors

GENERAL

On the TEXAS INTERURBAN, high speed interurbans, modern in every respect, and operating for 27.5 cents per car-mile, have had three successful years.

Equipment used:
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- G-E Type K-35 Control
- G-E Air Brakes
- G-E Type CP-27B Compressors

facts are quickly revealed

The AURORA, ELGIN & FOX RIVER ELECTRIC COMPANY, since commencing operation of modern cars, reported more gross revenue, better public relations, and operating costs reduced to 26.61 cents per car-mile.

Equipment used:
- 4—35 h.p. GE-265 Motors
- G-E Type K-35 Control

ELECTRIC

The PENN-OHIO SYSTEM modern cars, weighing 37,000 lbs., replaced 54,000-lb. cars on the Youngstown-New Castle line. A 30% saving in operating costs was the result.

Equipment used:

- 4—35 h.p. GE-265 Motors
- G-E Type K-35 Control
- G-E Air Brakes
- G-E Type CP-27 Compressors

Results that prove the value

The ILLINOIS TRACTION INC., on the Illinois Valley Division, saved $72,000 the first year of modern-car operation —a gross return of about 39% on the investment.

Equipment used:

- 4—35 h.p. GE-265 Motors
- G-E Type K-35 Control

GENERAL

The UNITED ELECTRIC RAILWAYS COMPANY, Providence, with 175 modern cars, has reduced maintenance cost 15%, pull-ins 50%, and platform expense 20%.

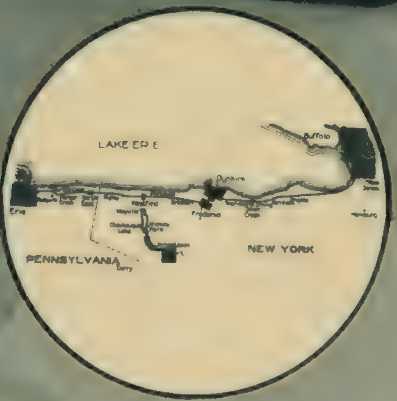
Equipment used:
- 4—35 h.p. GE-265 Motors
- G-E Type K-35 Control
- G-E Air Brakes
- G-E Type CP-27 Compressors

Providence, R.'I.

of modern rolling stock

The BUFFALO & ERIE RAILWAY by the acquisition of attractive, modern, light-weight cars reduced operating costs from 37.5 cents to 28.9 cents per car-mile. The improved service brought greater revenue and put the property on a paying basis for the first time.

Equipment used:
- 4—40 h.p. GE-247 Motors
- G-E Type K-35 Control
- G-E Air Brakes
- G-E Type CP-27 Compressors



E L E C T R I C

The KENTUCKY TRACTION & TERMINAL COMPANY increased net earnings 102%. The biggest factor in attaining this result was the low operating cost with modern cars—20.6 cents per car-mile.

Equipment used:

4–25 h.p. GE-264-A Motors
G-E Type K-35 Control
G-E Air Brakes
G-E Type CP-27B Compressors.

Modern cars are increasing

The INTERSTATE STREET RAILWAY saved 35% in power costs by modernizing. Bought at auction from a receiver in 1925, this property has been entirely rehabilitated with modern cars, and is now operating for 28 cents per car-mile against 37 cents with the old cars.

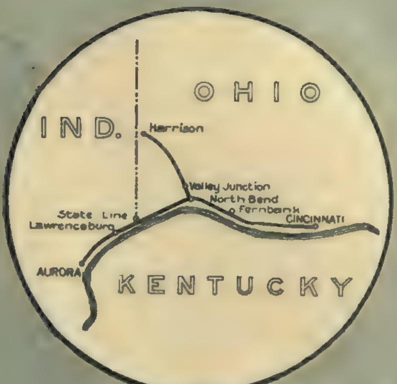
Equipment used:

4—25 h.p. GE-264-A Motors
G-E Type K-35 Control.

GENERAL

The CINCINNATI, LAWRENCEBURG & AURORA lowered operating expense to 19.6 cents per car-mile. One of the earliest properties to recognize the possibilities of modern cars, this Company has been reaping the benefit of extremely low operating expenses for several years.

Equipment used:
- 4—25 h.p. GE-258 Motors
- G-E Type K Control
- G-E Air Brakes.



the list of profitable roads

The GRAND RAPIDS RAILWAY COMPANY has decreased energy consumption over 40% and increased passengers per car-mile over 60% with 27 new cars of ultra-modern design. These were put in operation after experimenting with the three cars exhibited at last year's convention.

Equipment used:
- 4—35 h.p. GE-264 Motors
- G-E Type K Control
- G-E CP-27 Compressors
- G-E non-resonant Gears for 23 of the 27 cars ordered.

Grand Rapids, Mich.

ELECTRIC

–facts like these take the modern car beyond the experimental stage

MORE RIDERS

BETTER PUBLIC RELATIONS

LESS POWER USED

FASTER SCHEDULES

QUIET OPERATION

COMPETITION OVERCOME

LOWER MAINTENANCE COSTS

NO LONGER is there any doubt as to the ability of modern cars to pay for themselves and return a profit. The cases cited on the preceding pages are but a few of many notable successes.

Financing new cars has ceased to be a problem. Their proven ability to earn their way has made the factor of original cost a side issue.

Some of the 25,000 obsolete cars on the tracks last year, have been replaced. Many more are still unnecessarily eating up earnings of the electric railway industry.

Those obsolete cars must be replaced before the industry can attain its just share of America's present prosperity.

Bulletins GEA-234 and GEA-253—full of facts about successful modern car installations—can be secured either at the convention or by writing General Electric Company, Schenectady, N. Y.

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Surely the Road Opens Ahead

BEFORE the electric railway industry there is gradually opening a broadened vista. Bends and crooks in the road are less tortuous and confusing. There appear patches of light ahead, penetrating sharply through the former enshadowing gloom. There are visible glimpses of a smoother and straighter road, leading constantly toward accomplishment, service and success.

MOST of the industry has stopped looking for sympathy. It is too busy struggling ahead toward substantial success. It has become aware of the obvious fact that an individual or an industry which falls victim to self-pity and is content to ask for charity, may expect to live in the poorhouse. This is an age of keen competition. An industry no more than an individual can afford to pause long by the wayside contemplating the route behind—rough though it may have been. Progress presses on and he who hesitates is soon counted out in the impatient rush toward greater convenience, increased comfort and luxury—better living conditions.

TRANSPORTATION is an essential part of modern everyday life. And the electric railway industry is beginning to realize the full significance of modern competitive conditions. Although still theoretically a monopoly, common carriers are in actual competition with individually owned vehicles. They are beginning to understand how to approach the situation. They are beginning to interpret the full significance of the much-talked-of need for transportation salesmanship. The start of any intelligent selling campaign should be a careful analysis of the product itself and its markets. Electric railways are becoming better sales organizations.

IN THOSE instances where substantial progress has been made in this direction, there has quickly taken place a replacement of old and dilapidated equipment with the finest which the builders had to offer. There has developed a growing demand for still further improvement of the vehicle in which rides are sold. Such a program of rehabilitation and replacement has proved profitable on practically every property where it has been followed. The first big step in making transportation pay has proved to be the application of new, improved equipment and modern methods of operation. The experiences of many properties, as outlined in this issue, indicate what can be done.

THE road is becoming smoother. Fear and doubt disappear under the stimulus of accelerated motion. One after another the record is being written of properties which have emerged from stagnation to progress. The industry as a whole is getting ready to move forward—"full speed ahead"!

Eight Cents per Car-Mile May Change Red Figures to Black

REPLACEMENT of old cars by new can reduce operating cost approximately 8 cents per car-mile. That, in a nutshell, is the result shown by a survey, appearing elsewhere in this issue, covering the experience of twenty electric railways which have been active in adopting modern equipment. Looking at the matter from another angle, the cost on these properties is 9 cents per car-mile less than the cost on twenty comparable railways which have made but little progress in modernization. More convincing evidence of the value of new cars would be difficult to find.

The representative character of the railways embraced in the survey makes the comparisons particularly significant. All types of operation are included, city, interurban and combinations of the two. Service is rendered in large, small and medium-size communities. Under widely differing conditions, these progressive railways have all found that it pays well to substitute modern, light-weight cars for old, heavy rolling stock.

Economies were most clearly demonstrated in the conducting transportation and power accounts. Maintenance of equipment costs showed a smaller reduction, due possibly to an increased allowance for depreciation. In the way and structures account, naturally, the economic advantage of new cars was more difficult to find. Less significance attaches, perhaps, to the actual figures than to the disclosure that every one of these twenty railways made substantial savings by modernizing its equipment. It would be going too far to assume that replacement of old cars by new ones will always reduce operating expenses 8 or 9 cents per car-mile. In certain cases the resulting economies would probably be somewhat less than that, while in other cases they might easily be a good deal larger. The best indication of what may be expected, however, is the experience of the many railways of varying size and wide geographical distribution which have found modernization of equipment highly successful.

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Lost Revenue Regained by Better Cars

REVENUE-PRODUCING attributes of new cars frequently are lost to sight because of the spectacular character of the savings in operating expenses. It is easier to trace cause and effect in costs than in revenue, and the advantages of equipment modernization are more readily discernible. Of equal, or even greater, importance, however, is the increased traffic that results from the operation of better and more attractive cars.

Notable examples of increased patronage resulting from rolling stock improvement are cited in the experience stories by prominent railway executives, published in this issue. The Pennsylvania-Ohio Electric Company, from a low ebb in 1920, first won back its traffic from bus competitors by operating de luxe coaches. Attention was then turned to applying the same ideas to the rail business, and with the advent of new cars a substantial increase in riding occurred. On the Key System in California revenue on one line increased approximately $1 per car-hour after the line had been fully equipped with modern cars. Revenue on the Indiana Harbor division of the Gary Railways increased 2 cents per car-mile after modernization of equipment.

With new rolling stock in operation on the Youngstown & Suburban Railway during the first five months of the present year the gross passenger revenue was about 4 per cent greater than during the corresponding period in 1925. Traffic increases as the result of operating new cars are reported also by the Interstate Street Railway, the Cumberland Traction Company, the Buffalo & Erie Railway and the Morris County Traction Company. In Grand Rapids, revenue has shown an extremely encouraging growth since the new equipment has been in service. The gross for each month of this year has been larger than that for the corresponding month last year. These are but a few among the many railways that have experienced a gain in traffic as the result of improvement in equipment.

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The Bus Is Finding a More Definite Place

THE meaning of bus service supplemental and auxiliary to electric railways is becoming clearer. In most states regulation has changed the competitive situation except with respect to interstate buses. It has therefore become possible to study bus operations started in an emergency for self-preservation, with a view to avoiding the wasteful duplication that resulted. This has gradually led toward more fundamental thinking with respect to the bus and enlarged vision of its possibilities. Instead of proving to be white elephants after the need for protection from competition was overcome, buses have proved valuable for opening up new avenues of revenue. In some instances this process has been held back by fares which, having been established in the competitive period, are too low and are now difficult to change.

Special party, de luxe express and tour services have proved to be both popular and profitable. Fare limits in such service have been flexible enough to make profitable operation possible. There is little question but that large opportunities exist for expansion in this direction. There is a rapidly growing number of people who, having tasted the luxury of the private automobile, are no longer satisfied with the democratic, low-price, common-carrier vehicle. Just as the steam roads have found a growing patronage for solid Pullman excess fare trains in long hauls, so does a similar demand seem to exist for something exclusive in short-haul travel. It does not seem to be so much the actual comfort or luxury that is demanded as the select association or "exclusiveness" which comes with a preferred form of service. A distinctly higher fare than that of the basic transportation agency seems to be essential.

In the case of city properties the past year's experiences in Washington and Kansas City, where 25-cent de luxe express lines have been gradually attracting increased riding, show the possibilities of further bus expansion in this direction. With the constantly increasing congestion of city streets, de luxe express service at fares of 25 cents, or some variation in the form of a taxi-bus making a comparatively high mileage charge, would appeal to an increasing number of automobile drivers and would make a distinct contribution to the relief of traffic congestion. With that in view, vehicles for such service should preferably be comparatively small in size and not over three seats wide.

Small capacity would increase the "exclusiveness" of the ride and make possible schedule speeds approximating true express operation. The fare should be high enough to compensate for the small carrying capacity.

Much progress has been made in finding the place of the bus. That place is a large one in the general scheme of transportation, but it becomes more evident steadily that it is not found in duplication or replacement of any large electric railway mileage. Replacements of rail operations in territory that will not support rail service are a minor rather than a major field for the bus.

As experience has grown it has become increasingly clear that there is no mysterious "rubber urge" in respect to common-carrier transportation. There is a demand for something that approaches the automobile in luxury and exclusiveness. Co-ordination is taking on a more definite meaning. The bugaboo of the bus as a competitor is disappearing. Transportation men are realizing that the individually owned vehicle is the real competitor and that each form of common carrier has a proper place in meeting this competition.

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Maintenance, Too, Must Meet Today's Popular Demand

SUCCESS in full measure demands a full measure of modernization. Even new cars may fall short of attaining the results that should be expected of them if they are allowed to run down in conformity with the old idea of "adequate" service.

Adequate maintenance standards today must be measured in terms of operating excellence expected by an automobile riding public. Modern cars are designed with closer fits and smaller clearances—these are among the details that make them modern. For continued improved performance they must be kept in a condition which rises above former standards. In the hands of master mechanics, in so far as the management policies permit, lies the power to sustain or destroy the reliability and performance of new equipment.

Light cars, when well designed, ride easier on rough track than the older, heavier units. This makes for public satisfaction, but it should not be accepted as an excuse for failure to improve the track. It should be accepted only as a preliminary to such an improvement. Compare this with the highway situation. Only a few years ago any kind of a hard road was considered entirely satisfactory. But now concrete roads have been developed so that the automobile passenger resents a surface that is only slightly uneven. So it is with track. Here the maintenance of way engineer fits into the new car program, but he must have an adequate budget and a proper sense of modern demands to win public approval of his track.

To read through the cross-section of recent developments contained in this issue shows that much has been done in establishing better maintenance practices. In Pittsburgh both the way and equipment departments have been reorganized, so that a better job is being done at lower cost. The Cleveland management for years has given special attention to improving maintenance, by the development of improved tools and methods. Other properties show similar evidence of improvement in maintenance practices.

Maintenance men might well be in close touch with the public relations department. Behind the lines, their work largely unseen by the general public, they can do a great deal to create or to destroy the good will of the public.

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What New Cars Are Doing for Public Relations

AMPLE evidence is available in the columns of this issue to indicate the degree of success which has been attained in carrying out a program of building good will through installation of improved cars. Properties which long since had bidden farewell to the last vestige of public concern in the ultimate working out of the railway's destiny have lived to see that interest restored and enhanced to a degree unconceived even a few years ago.

Take the street railway in Gary, for example. This Indiana industrial town was literally flooded with unrestricted jitneys shortly after the war and the railway's earnings began to take a sharp decline under this cutthroat competition, which seemed ominous. But improved light-weight, one-man cars and carefully revised headways and schedules won the support of the public in favor of the progressive established carrier. Six months later an ordinance was passed excluding all jitneys from the streets.

Grand Rapids presents another example. Realizing that pride in its railway system is the first step toward public friendship, patronage, fair franchise terms and adequate rates of fare, the railway has bent every effort to improve the physical equipment with which its service is rendered. The recent unsolicited statement by Mayor Swarthout that it would be well to subsidize the railway if necessary to continue the program of improvement thus auspiciously started is unnecessary of comment. Prominent citizens and local organizations have been proud to have the new Grand Rapids cars named after them.

No attempt was made in Schenectady to bargain for "so much increased good will per new car." It was felt by the local railway officials that once the people were convinced of the sincerity of the company's expressed desire to give the best possible service under existing conditions, good will, with all of its by-products, would follow. A healthy development of employee morale and of public co-operation has been manifested since the first of the new cars were placed in service on that property. The Eastern Massachusetts Street Railway has experienced much the same reaction in its program of winning good will through the medium of putting its house in order. New cars have proved to be tangible evidence of a railway's desire to meet the public half way.

These are but random examples. Wherever the railways have had the courage to throw down the gauntlet to their outstanding rival, the private automobile, and have taken a few leaves from the latter's book in the matter of improved comfort and appearance results have not been slow to manifest themselves in the form of public appreciation and patronage. Public relations work, after all, seeks only friendship, and nothing stimulates friendship more than a sincere effort to improve the character of equipment and service offered the community.

By-Products of Modern Cars

DISCUSSIONS of light-weight cars are prone to dilate on the advantage of light weight *per se.* True, much is gained in cost and in characteristics that make the light-weight car a valuable innovation. Savings in car and track maintenance as well as lower energy consumption may spell the difference between bankruptcy and profit. Still, these obvious advantages do not begin to tell the story of what the weight reduction can be made to accomplish on a property where every possibility can be turned to account.

Take the case of power supply. Many roads operating heavy cars have their systems loaded to capacity. Any addition to service means a revision of the substations and distribution circuits, or, worse still, an increase in generator capacity. Replacement of heavy cars with light ones will not only reduce energy consumption but will release system capacity. This can be used to give an increase in service, or, if this is not needed, the surplus power can in many instances be sold at a profit. In case of purchased power, the maximum demand will be lessened, with resultant lowering of the charge or possibility of revision of the contract on advantageous terms. Then, too, the voltage drop will be lessened. In fact, light-weight cars with relatively small motors have often been able to make better schedules than the large ones they replaced, due to better regulation.

Of an entirely different nature is the possible saving in shop facilities. Machines of smaller capacity can be purchased to care for the light-weight equipment. Parts can be handled with greater facility, reducing dead time and taking less manual labor. The cost of spare parts, usually, is less for the light equipment.

Possibilities for lighter track construction are discussed elsewhere. But there are further savings than in use of lighter rail and fewer ties. The handling of these materials is easier, an important factor in reducing cost. If the street requires opening less often for track repairs, delays to the cars and the resulting loss of revenue are minimized. A broken-down car on the street can be moved more readily and the line restored to service sooner than with heavy equipment.

It does not take a great deal of imagination to expand such a list of advantages as this. Some of them are obtained automatically with the substitution of light cars. Others require planning of the management if they are to be secured in full measure. But only when careful attention is paid to the matter will the greatest advantage of light-weight cars be obtained.

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Light-Weight Cars Reduce Track Costs

TRACK maintenance and reconstruction are major items of cost in the operation of an electric railway. But unfortunately it has been very difficult to determine definitely the effect of changes in rolling stock design upon the life of the track structure. A general claim for light cars has been that maintenance costs of existing track are reduced and that material savings can be made in the cost of new construction.

Fortunately, definite figures are now available from the experience of the Kentucky Traction & Terminal Company, where careful records indicate the effect on track cost of a complete change to light equipment made a number of years ago. In an article published in this issue F. W. Bacon presents figures showing that even with an increase in service aggregating 25 per cent as measured in car-miles, the ton-miles decreased 44 per cent. Under these conditions experience has shown that less general tamping and alignment work is needed on the old track. Wear on curves and expensive special work has been materially reduced. Tie renewals and the size of track maintenance forces have been cut down.

In the replacement of track it was found practicable to go to lighter construction. Even with tie spacing increased 50 per cent the records show decreased maintenance required. This is attributed to decreased impacts on the rail ends.

This is not the only road where such savings have been made possible by lighter equipment. It is, however, one of the few where the complete change to light equipment has been made for a long enough period of time to develop definite comparative records. This effect on track life is undoubtedly being duplicated wherever light-weight cars are used.

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All ready for the Cleveland convention of the A.E.R.A.

At the left is the recently completed exhibit building, and at the right the Public Auditorium. Between them are the tracks for the display of modern cars and track machinery

PERFORMANCE

is the keynote of Cleveland Railway's success

By JOHN J. STANLEY

President the Cleveland Railway

JOHN J. STANLEY

Public confidence has been won and patronage has been built up by the employment of modern equipment and good track, maintained by methods many of which have been developed to fit the exacting needs of this property—Electric surface cars, rapid transit trains and motor coaches all contribute to this great transportation system serving a population of more than a million people —Public co-operation has supplanted demands for public ownership

◆

SUCCESS has attended the operation of the Cleveland Railway during the past sixteen years under the Tayler plan because its watchword has been "performance." Besides building up a transportation system which we believe to be second to none, the winning of public confidence, resulting in the acceptance of transportation as an essentiality, has been the principal achievement of this period. Like the rest of the industry, we have passed through times of doubt and stress. In every instance we have emerged successfully because of this confidence on the part of the public we serve. This performance has been accomplished by the maintenance of fast schedules with modern cars adapted to the needs of the community. High-grade maintenance of cars and tracks has made this possible. The power supply has been completely rebuilt, changing from isolated generation to an all-purchase basis. Machine methods have been developed for track reconstruction that lessen the time during which important thoroughfares are torn up, thus decreasing the delay to vehicles and the liability of accidents.

We welcome you to Cleveland, gratified that you have selected this city in which to hold your 45th convention. We expect to gain much from your visit. We likewise hope that you will be well repaid. To those of you who have been in Cleveland before, as well as to those for whom this is the first visit, the Cleveland Railway extends a welcome and will be delighted to show you any part of its workings. —JOHN J. STANLEY

Aside from physical elements, discussed at greater length elsewhere, the operation of the company under the Tayler plan is of interest. The start as a unified system of street railways dates back to 1893, when four separate companies were brought together. In 1903 the Cleveland City Railway was bought, thus completing the unification of the existing surface lines. However, during the first decade of this twentieth century, the era of the greatest popularity for most street railways, the reverse was true for Cleveland. The agitation for the 3-cent fares, beginning in 1899, finally culminated in the operation of 3-cent lines in 1906 by Tom Johnson. From that time until 1909 three years of turmoil and grief were experienced, but in December of 1909 the City Council ratified the ordinance embodying the Tayler plan as outlined by its author, the late Judge Robert W. Tayler.

For sixteen years since March 1, 1910, when the "service-at-cost" operation under the Tayler plan first became effective, the Cleveland Railway has continued to exist and grow in comparative peace and harmony. During this period attention was concentrated on producing transportation adequate to the growing needs of the city. The success of these endeavors has been twice expressed by the people of Cleveland in the renewal of the original grants on the basis of the Tayler plan, in 1919 and still more recently in the important revisions agreed upon in 1926.

This latest change in the history of the company became effective July 1 of this year in the passage of Ordinance No. 70561-A. While this is a renewal of the street railway grants, several important changes were made to meet changed conditions. They may be briefly summarized under six items, as follows: The extensive bus operations started on a somewhat temporary basis last year have been made a definite part of the Cleveland Railway and placed under the provisions of the new franchise. The second important element in the new ordinance has been to allow an increase in the interest fund from the middle point of $500,000 to $800,000. This increase in the interest fund was necessary to meet the expansion of the company since the original ordinance of 1909 was first made effective. Now the fare will be increased one step when this fund drops to $500,000 and decreased when it rises to $1,100,000.

Several of the important changes of the new ordinance have been designed to make possible the floating of 6 per cent treasury stock at par—a condition of the franchise—when deemed necessary by the city and the

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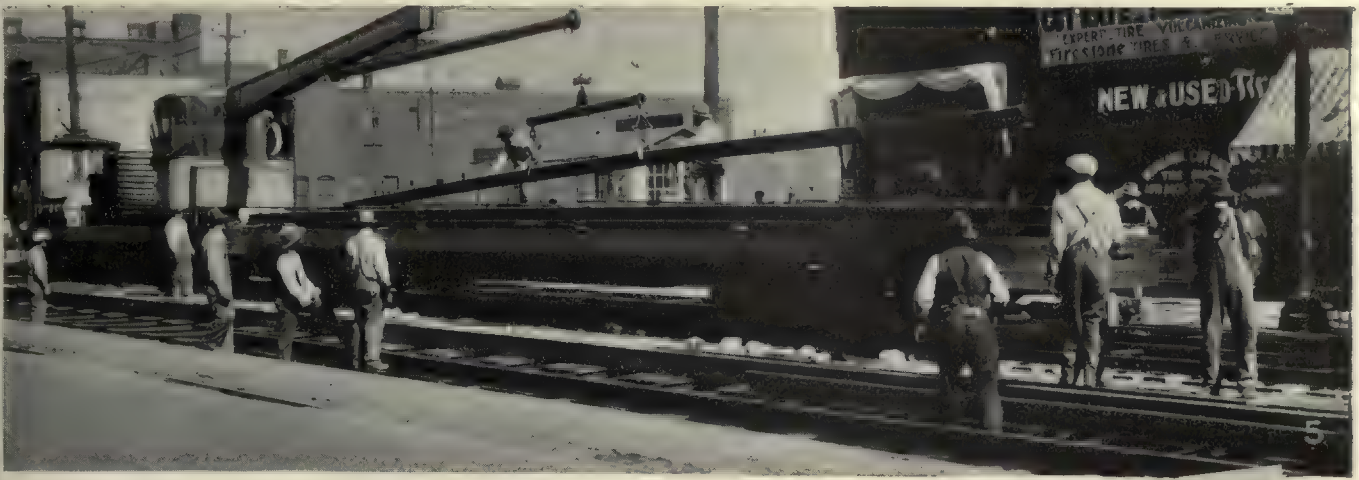
Cleveland's modern performance demands machines and methods that permit of rapid track reconstruction

No. 1. After the paving block has been lifted the concrete breaker moves over the track to be removed.
No. 2. Then the old rail is lifted by crane and loaded.
No. 3. The next step is to follow along in the trench and remove the broken concrete by means of the electric shovel, loading the material into cars on the adjoining temporary track. This shovel runs either on rails or on caterpillar tractors.
No. 4. Following the preparation of the trench, the steel ties are laid on blocking. Note the rail on trail car ready to be unloaded.

4



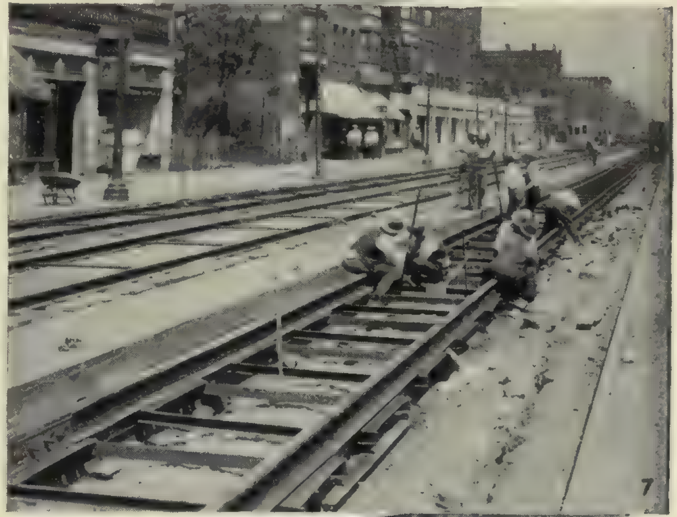
Hand labor is avoided whenever machines can do the work more rapidly

No. 5. The 60-ft. rails especially designed for the Cleveland Railway are loaded with equal number of "rights and lefts" and unloaded by means of the crane.

No. 6. The steel ties are then hooked to the rail. This view shows a temporary crossing for vehicles being prepared. In this job on Woodland Avenue, Cleveland, the old rail was not removed, but dropped into the trench, where it acts as a further support for the new tracks built on top of it. The old rail, of course, will be imbedded in the concrete of the sub-base.

No. 7. Bringing the track to line and grade. Joint plates are riveted to the rail ends, which are first held temporarily by bolts.

No. 8. After the rail is brought to line and grade concrete is poured by means of a specially constructed concrete mixer operating from the new tracks, as shown in this picture of work accomplished this summer.



company to provide for further expansion. Prior to 1920 the market price of Cleveland Railway stock fluctuated above or below par, but since 1920 the market conditions have been such that the market price has been consistently below par, making the sale of new stock under the terms of the franchise impossible.

The new ordinance extends the street railway and bus grants for 25 years, with the provision that in case no action of renewal is taken after ten years of operation the city will lose control of the service and the company may set up a separate fund of ½ cent per car passenger and 1 cent per bus passenger that may be used at the termination of the franchise, provided no action to extend the franchise has been taken, for the retirement of the outstanding common stock.

Beginning July 1 1½ per cent of the earnings are set aside for the retirement of certain outstanding securities, except that this fund shall first be used to create the additional $300,000 allowed in the interest fund.

The new ordinance further provides for an enlargement of the permissible schedule of fares determined from month to month by the condition of the interest fund. This new schedule of fares has an upper limit of 10 cents cash.

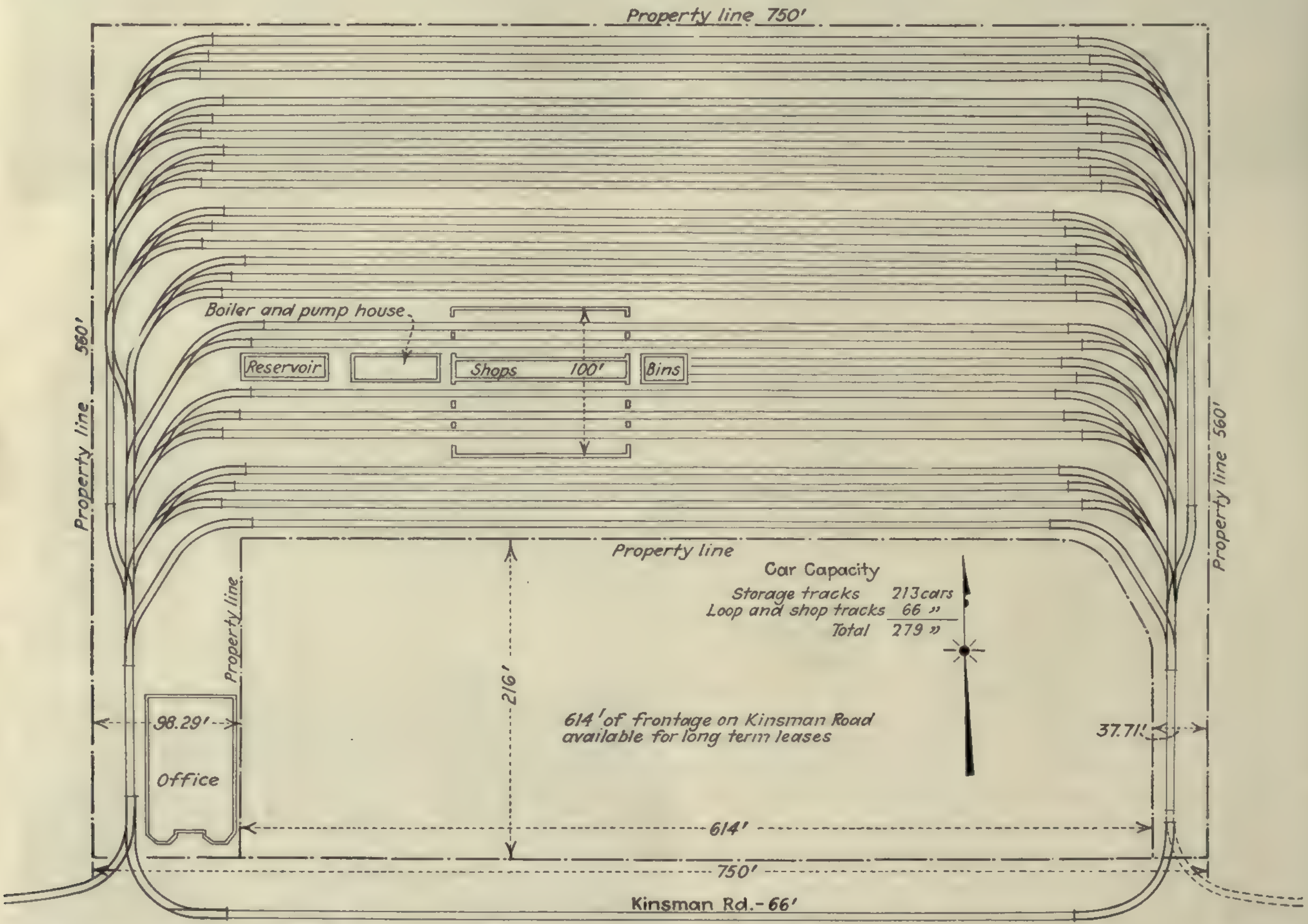
When deemed desirable to issue additional common stock the company may pay out of earnings a marketing charge up to $2 per share.

Whether or not these new provisions will be successful in raising the market price of our common stock to par or above remains yet to be seen. The time as yet has been too short to determine whether such a condition will prevail.

TRANSPORTATION EQUIPMENT

Modern equipment and up-to-date methods of operation and maintenance are of tangible interest in a study of the property. Perhaps the feature that first impresses the visitor to Cleveland is the train operation of excellent equipment and at reasonably high speeds. The rendering of this service is based on a co-ordination of good physical equipment, a high order of maintenance and a superior performance of employees.

There are 1,023 passenger motor cars in the service provided by the company, 494 trailers and 218 service cars of one kind or another. The average age of passenger equipment now in use is about ten years. We are planning to retire 100 cars during the year, or 6.6 per cent, which will reduce the average age to less than ten years.



This new operating station layout allows the leasing of valuable street frontage

The Cleveland Railway believes that 10 acres is necessary for proper operating conditions. This view shows one of the new developments, having 24 loop tracks sufficiently toward the rear of the property to make available the use of the frontage for long-term leases. Only the office seen to the left occupies frontage on Kinsman Road.

The latest standard passenger motor car is illustrated in views on page 492. One hundred have just been constructed in the Harvard shops. They are front exit side entrance type and are 51 ft. 2 in. over the bumpers and seat 52 people. The thought in mind in the construction of these cars was to design them to be strong enough to pull trail cars in rush-hour service and at the same time keep the weight down to a minimum, as the cars are run in single units for the major portion of the day. These cars are constructed of steel up to the belt rail and a combination of wood and steel in the superstructure. The trucks are Brill 68-E1 with 26-in. steel wheels. Four Westinghouse No. 340 50-hp. motors are used, having been designed especially for Cleveland service. The weight of these new cars is detailed as follows:

Car body	18,354 lb.
Trucks	10,636 lb.
Motors and equipment	10,540 lb.
Brake equipment	1,764 lb.
Heating equipment	446 lb.
Total	41,740 lb.

All motor cars on the system are equipped with energy-saving devices. A test recently run on the heaviest line of the system shows these cars to require a consumption of energy materially lower than any other type on the property. The results of this test are given in the following figures:

Type Car	Kilowatt-Hours	Car-Miles	Kilowatt-Hours per Car-Mile
400	593,011	219,991	2.69
800	15,213	5,610	2.71
1,300 (new)	39,898	15,753	2.53

The average energy consumption of the system for this same period was 2.66 kw.-hr. per car-mile.

Illumination of the interiors of these cars is from five 94-watt lamps connected in a single circuit, with a single spare lamp in the center of the car which may be turned into the circuit in the place of any one of the five by turning the selector switch until the spare lamp cuts out the defective lamp and relights the circuit. With the present type of prismatic reflector the intensity and distribution of illumination are very satisfactory. Both the life and efficiency of the large filament lamps are high.

In recent years there has been a tendency for the passenger to prefer the motor car of a two-car train. As an experiment three complete trains were taken out of service, stripped of all seats and, after refinishing the interior, were re-equipped with comfortable leather-upholstered bucket-type seats, 48 in the motor car and 60 in the trailer, instead of 56 and 58 seats respectively. While the cost of this change was rather high, they have met with great popularity. The prejudice against the

Improved facilities increase value of Cleveland's cars

Above, East Ninth Street Pier loop, serving the main passenger docks of Cleveland. These piers are just a short distance from the site of the coming convention.

In center, typical safety signal erected at Euclid and Superior Avenues.

Below, looking southwest across the Public Square, the center of Cleveland's transportation system. In the left background can be seen the site of the new Union Depot.

trailer is removed and both of these cars are used about equally. This experiment was told of in the ELECTRIC RAILWAY JOURNAL in the May 15, 1926, issue, on page 844.

MOTOR COACH SERVICE HAS GROWN RAPIDLY

Upon the passage of the Collister-Krueger act the Cleveland Railway, with the permission of the city, started seven motor coach lines and has extended this service to eleven lines this year. In all there are 56 miles of streets and highways served by the motor coach department. The different lines serve as feeders or cross-town connections except in the case of the Carnegie-Franklin-Clifton route, which is a main artery from the extreme eastern city limits through the downtown district over Euclid Avenue through the Public Square to the extreme westerly limits of the city in Lakewood. A 10-cent cash fare is charged on all the bus operations except on Mayfield Road. Some of the bus routes are proving successful financially, but to speak of the financial success of all is hardly fair, because so much of the service is in the nature of feeders, extensions or unremunerative cross-town lines.

A further description of the motor coach operation

One hundred of these cars have just been completed at the Harvard shops. They are designed for either single unit or for hauling a trailer in rush hours. These are the most economical cars on the system due to their light weight

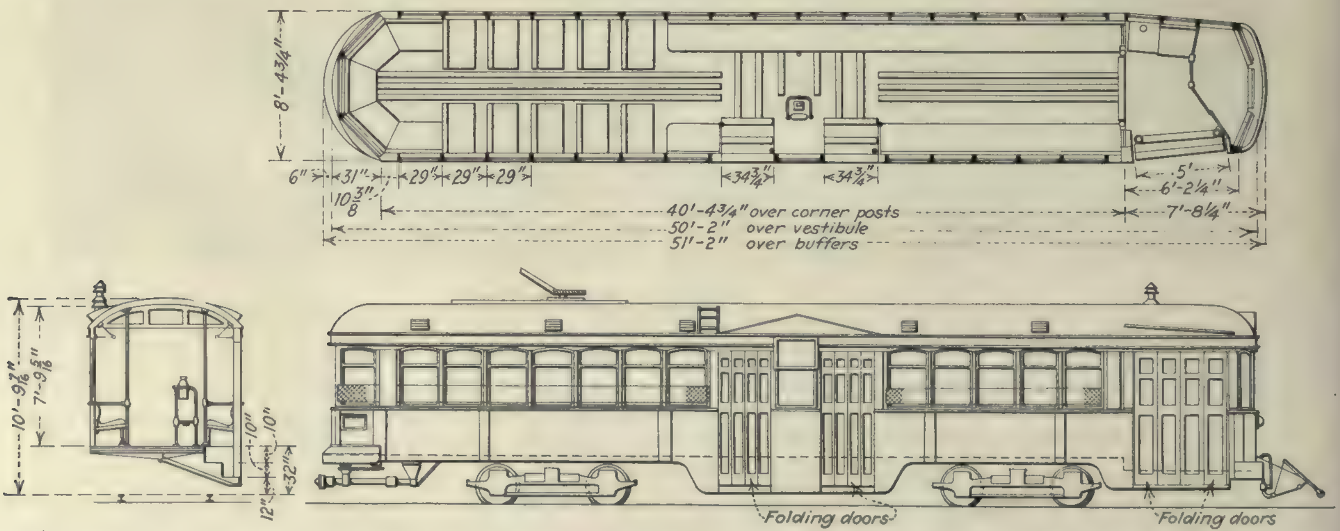
was given in the ELECTRIC RAILWAY JOURNAL, issue of March 27, 1926, page 545. The 50 double-deck coaches now in service seat 62 and are standard six-wheel Safeways using Continental motors. The length of this coach is 32 ft. 6 in. and the height over all 13 ft. 2⅜ in. The 61 single-deck buses have a seating capacity of 29 and were practically all manufactured by the White Motor Company. Pneumatic tires and Westinghouse air brakes are used on all coaches, both single and double deck.

All of the motor coaches are serviced in three garages and in each station a regular washing, greasing and overhauling schedule is maintained. Motor coaches which have been on the road are washed every night. All coaches are greased on a schedule that covers all elements once a week. Certain items are greased on Monday, certain items on Tuesday and so on for each day of the week so that the complete schedule is finished in five days. After each 2,000 miles a system of unit inspection takes place, at which time worn or defective units are replaced. The defective units are sent to a central shop for overhauling and repair. Our experience so far indicates that this method will keep the coaches in excellent operating condition at all times.

We are particularly proud of the performance of our Harvard shops. While much has been written about this plant, only a visit can truly depict the extensive shop equipment and facilities used in the maintenance of cars. During 1925 and 1926 100 motor cars were completely constructed in these shops except for trucks and electrical equipment. During the year 1925 a total of 711 cars were completely overhauled and painted. In addition to these 2,260 damaged cars were repaired, 5,228 armatures and fields and miscellaneous units were handled.

The shops are well equipped with modern machinery of standard manufacture, augmented by equipment designed for our particular use.

The Harvard shops, where the company's maintenance activity centers, are located on an 18-acre plot. Half



Side view, floor plan and middle section of the car illustrated above. Due to the lower weight of these cars, which totals 41,740 lb., the energy consumption is lower than any other cars of a similar type on the system of this tract is used for the car maintenance shops and the other half for a storage yard for way and structures materials and equipment. It is located centrally in an east-west direction but just south of the actual city limits.

Whenever it is possible to perform work by machinery, though the expense is the same as hand labor, this is done for the sole purpose of accomplishing an increase in speed. The quicker a job in a street is finished the less liability of accidents.

This fine type of architecture and landscaping used in substations erected in residential districts is illustrated by Automatic Substation No. 10 in Lakewood

Division foremen are in charge of all track maintenance and construction on their respective divisions, and a yardmaster controls all work trains and the loading, unloading and delivery of materials upon the requisition of each division foreman. A superintendent of machinery is in charge of all the electric shovels, plows, grinders, welders and other roadway machinery. It is his duty to place the roadway equipment on the job and to perform the work.

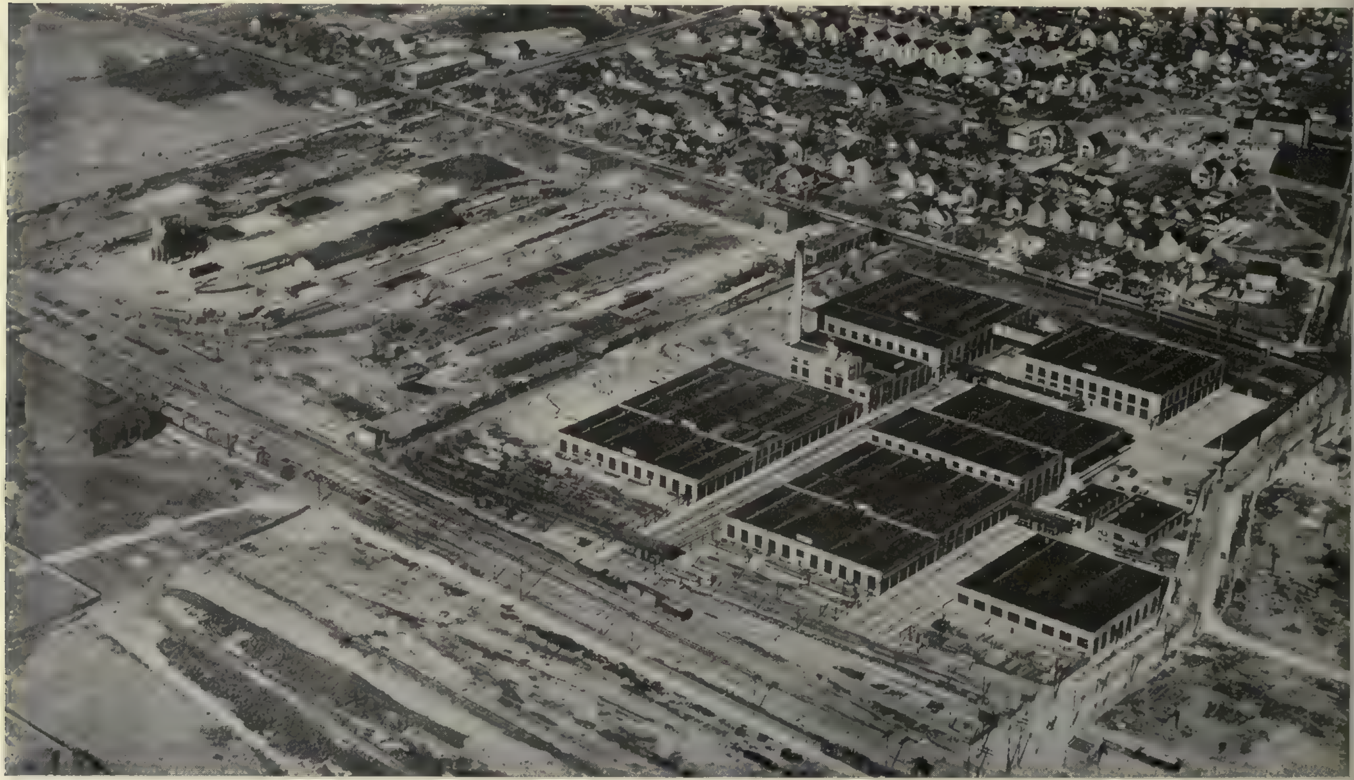
It is the practice of the Cleveland Railway to relay track with the least interruption possible to street car traffic, and for this reason temporary side tracks and crossovers are used wherever possible. Temporary side tracks can also be used in the loading and unloading of material from flat cars by use of a crane car. A track to be reconstructed is first plowed to remove all paving. This work is followed up by a work train, on which the old material is piled, or if to be used again on this job it is laid to one side. If the concrete base is to be removed a concrete breaker is operated over the track, which breaks the concrete base into small enough sections so that it can be handled by an electric shovel. The old rail is then removed, placed by crane on flat cars and taken to the Harvard yard. After the removal of the old rails and ties the broken concrete is shoveled onto flat cars and removed.

International steel ties are used in standard construction and are distributed by means of the crane into the track trench and placed in their approximate location. Sixty-foot rails previously loaded with the proper per cent of rights and lefts are then lifted by crane and placed on top of temporary blocking laid in the trench. This work is immediately followed up by a gang which hooks the steel ties to the rail and by still another gang

Modern cars and double-deck coaches perform the heavy service on Euclid Avenue

This intersection at Ninth Street is the heaviest traffic point on the system and one of the heaviest in the United States.

which rivet the joint plates by means of the automatic track riveter. When these plates are riveted the joints are further strengthened by welding the top and bottom of the plates to the rails. The next process is to warp the track to line and grade. The track is then ready for the pouring of concrete. The first course is poured to within 1½ in. of the bottom of the tie plates and after a proper period of setting the space under the tie plates is thoroughly packed with a dry mix of sand and cement. This is considered one of the most important elements of the work of securing a permanent track, and the dry mix is for this reason both hand and machine tamped. The paving base is then poured and the paving surface laid, which completes the track.



Harvard Shops—center of maintenance activities of the Cleveland Railway

To the right of this view of the 18-acre tract used for the maintenance of the cars and tracks of the company are seen the shops and to the left the storage yards used by the track department.

In the lower right-hand foreground is the carpenter and woodworking shop. Above it is the administration building, with the garage in the rear. Across the transfer table, from left to right, are the erecting and machine shop, the stores building and the truck shop. The main car transfer runway, the longest in the world, divides the shop in two. The buildings to the left of this runway, from left to right, are the paint shop, power plant, motor and armature department, and motor shop. The power plant serves the entire layout, furnishing heat, compressed air and waste disposal service.

It is planned to have some of this work in progress during convention week, with gangs working day and night so that delegates may observe the use of the machine equipment, some of which is peculiar to this property.

Paving materials are purchased by weight, a method which has been found to be very accurate. These materials are piled high in the yard to save space, this process being made possible by the 15-ton gantry crane used in the storage yard.

With the shutting down of the Viaduct power plant on Nov. 6 of last year and the completion of the last of the ten automatic substations the Cleveland Railway went on an all-purchased power basis. It now has fifteen substations constructed since 1910, five of which are manually operated and ten non-attended automatic substations.

Of particular interest is the control system used to supervise and operate the automatic substations. This centers in the load dispatcher's office, on the seventh floor of the Hanna Building. From this point the load dispatcher handles the manual stations by telephone and the automatic stations by means of a system of low voltage operating circuits through a series of relay chains that automatically sets up the functioning circuits at the substation. The basic principles employed in this work are similar to those of the automatic telephone. In addition to being able to perform any of the usual operations at a remote substation at will, the automatic functioning of this equipment is reported back to the load dispatcher through a series of lights.

A complete description of the Cleveland Railway power system has been written by L. D. Bale, superintendent of power, appearing in the ELECTRIC RAILWAY JOURNAL, issues of Sept. 4, 11 and 18.

Construction and maintenance of the distribution system is carried on by the power department with the aid of seventeen trucks, one line car equipped with a collapsible tower and two work trains. Twelve of the automobile trucks are also equipped with towers. The emergency construction and maintenance of the entire system is handled from a centralized location in the downtown area of the city.

There are at present 123 electric track switches in operation on the system. All work in connection with the installation and maintenance of these units is under the jurisdiction of the power department.

This brief outline of the physical operations of the Cleveland Railway will serve to indicate some of the major elements of this transportation system that is successfully serving more than 1,000,000 inhabitants through its 425 miles of track and 56 miles of bus routes. This service spreads over the city and well into the many suburbs surrounding Cleveland.

In Providence the United Electric Railways is now operating a large part of its service with modern cars of this type

VALUE OF NEW CARS

proved by the experience of twenty railways

By JOHN A. MILLER, Jr.
Associate Editor Electric Railway Journal

Replacement of heavy cars by those of lighter weight has resulted in substantial savings — Survey shows that average operating costs are 25 per cent lower for group of companies with modern rolling stock than for similar group with old equipment

MONETARY savings amounting to many million dollars have resulted from the replacement of old heavy cars by new lightweight equipment on twenty electric railways notable for their modernization policies. A survey made by ELECTRIC RAILWAY JOURNAL shows that operating expenses on these properties have been reduced from about 36 cents per car-mile to about 28 cents per car-mile, largely as a result of the improvement in equipment. The present average cost per car-mile is approximately 25 per cent lower than the average for a similar group of companies with older rolling stock.

Included in this survey are railways rendering service under a wide variety of conditions. Among them are both city and interurban properties. In size the companies range from one with about 10 miles of track to those having more than 500 miles. The populations of the territories served vary from a few thousand to well over a million. In each case, however, the purchase of new cars has resulted in a substantial reduction in operating expenses.

For purposes of comparison the average operating cost for the calendar year ended Dec. 31, 1925, was determined for a group of twenty progressive railways and also for a second group of properties conspicuous for their lack of modern equipment. The latter were selected one by one to correspond as closely as possible in size and operating conditions with the railways in the first group. No statistics were used from any property where the conditions are so unusual as materially to affect the operating cost, either in the group of modernized or that of backward railways.

Each group of twenty railways operates some 5,000 cars on approximately 2,500 miles of track. In each group are city companies, interurbans and railways giving both types of service. The combined population served by each group, as closely as can be estimated, is slightly under 4,000,000. Each group operated approximately 137,000,000 revenue car-miles in 1925. Average wages of transportation employees were found to be substantially the same, being 57.2 cents per hour for the railways of group one and 58.2 cents for those of group two.

In the matter of rolling stock, however, the two groups are entirely dissimilar. On the average the

Economies resulting from the operation of modern cars have made it possible for the Interstate Street Railway to provide transportation service at a reasonable profit in the Attleboros

Convenient transportation is provided at low cost with up-to-date cars by the Poughkeepsie & Wappingers Falls Railway

companies of the first group have acquired about half of their total active passenger cars within the last five years, whereas those of the second group have acquired only one-tenth during this period.

Under the different conditions encountered on the railways of these two groups considerable variation occurs in the operating expenses of individual companies. Due to low wages or cheap power some railways with old rolling stock have been able to keep down the cost per car-mile to a comparatively low figure. Conversely, high wages make operation expensive in certain instances despite the modernization of equipment. By averaging for each group the data of twenty typical railways, however, the effect of special conditions has been minimized and a representative figure has been obtained.

Total operating expenses of the modernized group average only 28.29 cents per car-mile, including depreciation, as compared with 37.94 cents per car-mile for the companies with old equipment. Figures for each group separated into the usual six general classifications are given in Table I.

As all other conditions are nearly equal, the difference in operating expenses of 9.65 cents per car-mile between the modernized and non-modernized group can be attributed largely to improvement of rolling stock in one case and lack of it in the other. Much of the difference in the conducting transportation account

Table I—Comparison of Operating Expenses, 1925, of 20 Progressive and 20 Backward Railways

	Cents per Car-Mile						
	Way and Structures	Maintenance of Equipment	Power	Conducting Transportation	Traffic	General and Miscellaneous	Total
Group I Modernized....	4.20	3.17	4.78	10.96	0.13	5.05	28.29
Group II Not Modernized..	6.89	4.93	6.00	14.42	0.27	5.43	37.94

Both single and double - truck safety cars are extensively used by the Houston Electric Company

Light-weight cars give satisfactory and economical transportation service at Bangor, Me., up in the northeastern corner of the United States

probably is due to a larger amount of one-man operation in the modernized group. Savings in the way and structures, equipment and power accounts, on the other hand, are directly traceable to lighter and more up-to-date cars.

This conclusion is confirmed by further examination of the operating statistics of the railways in group one.

Table II—Comparison of the Operating Expenses of 20 Progressive Railways Before and After Modernization

	Cents per Car-Mile						
	Way and Structures	Maintenance of Equipment	Power	Conducting Transportation	Traffic	General and Miscellaneous	Total
Group I Modernized....	4.20	3.17	4.78	10.96	0.13	5.05	28.29
Group I Before Modernization.......	5.75	4.39	7.19	13.66	0.10	5.32	36.41

From this it will be seen that the same companies which are now operating for 28.29 cents per car-mile were a few years ago spending an average of 36.41 cents per car-mile with old equipment. Classification of these expenses under the usual six headings is given in Table II.

On the basis of an average reduction of 8.12 cents per car-mile in the cost of operation due to modernization of equipment these twenty railways, operating 137,311,472 car-miles in 1925, made a saving of more than $11,000,000.

The largest single saving was the reduction in the cost of conducting transportation. While this is attributable in large part to a greater amount of one-man operation, the higher speed of modern cars has been an important factor in reducing the expense per car-mile. The saving in the cost of power, which was nearly as large as that of transportation, is the direct result of the operation of lighter cars. Maintenance of equipment costs have been reduced because of the

Table III—Classification of Operating Expenses, Cents per Car-Mile—Twenty Railways Described on Pages 499-501

Authority	Way and Structures		Maintenance of Equipment		Power		Conducting Transportation		Traffic		General and Miscellaneous		Total Operating Expenses	
	1925	Old	1925	Old	1925	Old	1925	Old	1925	Old	1925	Old	1925	Old
Boston Elevated Railway *	6.78	6.28	7.02	7.85	4.56	8.90	20.82*d*	22.44*b*	0.01	0.01	4.74	4.69	43.93	50.17
Pittsburgh Railways *	6.28	9.81	5.63	6.91	5.05	6.30	18.31*c*	19.22*b*	....	....	7.18	4.96	42.45	47.20
United Electric Railways *	8.13	9.22	6.94	5.99	5.24	6.07	16.58*h*	19.45*b*	0.08	0.04	4.65	4.11	41.62	44.88
Houston Electric Company †	1.72	2.34	2.09	3.07	4.21	2.70	9.15*h*	11.82*f*	0.15	0.04	4.42	7.05	21.74	27.02
Coast Cities Railway *	2.67	2.83	2.84	3.95	6.73	6.11	11.01*g*	12.31*e*	0.02	0.13	2.36	2.63	25.63	27.96
Poughkeepsie & Wappingers Falls Ry. *	7.47	5.33	3.47	3.96	5.37	6.61	8.08*a*	12.58*b*	0.17	0.16	6.55	6.53	31.11	35.17
Ohio Valley Electric Railway *	4.63	4.67	2.57	2.88	3.56	4.00	9.55	11.69	0.14	....	7.77	8.09	28.95	31.33
Southern Ohio Public Service Co.	1.30	1.90	1.00	2.50	4.10	6.00	12.20*a*	12.00*a*	0.50	0.20	3.10	6.70	22.20	29.30
Interstate Street Railway *	3.10	4.09	2.47	8.14	5.38	8.92	9.38*a*	13.08*b*	....	....	5.77	3.52	26.10	37.75
Bangor Hydro-Electric Company *	6.50	7.05	4.70	5.71	0.70	3.42	9.40	11.90	....	0.10	5.40	4.98	26.70	33.16
Cumberland Traction Company *	4.24	4.92	3.18	5.24	4.72	5.84	6.94*a*	8.53*b*	....	....	4.14	3.47	23.22	28.00
Buffalo & Erie Railway †	3.10	5.60	1.90	2.30	3.30	5.00	10.70*a*	14.00*b*	0.70	0.30	9.10	10.30	28.80	37.50
Kentucky Traction & Terminal Co. †	5.10	5.30	1.30	2.90	2.40	6.70	8.20*a*	10.80*b*	0.50	0.30	2.50	4.50	20.00	30.50
Aurora, Elgin & Fox River Electric Co. *	3.29	6.07	2.55	4.53	4.35	9.38	12.15	17.79	0.34	0.55	3.93	3.98	26.61	42.30
Morris County Traction Company *	4.50	5.46	2.80	2.80	5.19	6.47	8.01*a*	8.87*c*	0.05	0.02	4.68	5.15	25.23	28.77
New Haven & Shore Line Railway *	1.68	7.23	2.68	4.24	4.51	15.02	5.21*a*	10.06*b*	0.05	....	5.35	6.49	19.48	43.04
Milford & Uxbridge Street Railway	3.61	5.07	3.25	3.09	6.72	8.15	10.40	14.92	....	....	2.57	2.97	26.55	34.20
Beaver Valley Traction Company *	3.93	5.28	3.77	5.62	4.56	5.43	10.17	14.63	....	....	8.67	6.99	31.10	37.95
Warren & Jamestown Street Railway *	2.85	11.87	1.55	4.35	7.75	10.25	9.18	11.18	....	....	4.67	6.54	26.00	44.19
Lewistown & Reedsville Electric Ry.	3.27	4.71	1.72	1.86	7.11	12.63	13.83	16.00	....	....	2.67	2.70	28.60	37.90
Average	4.20	5.75	3.17	4.39	4.78	7.19	10.96	13.66	0.13	0.10	5.05	5.32	28.29	36.41

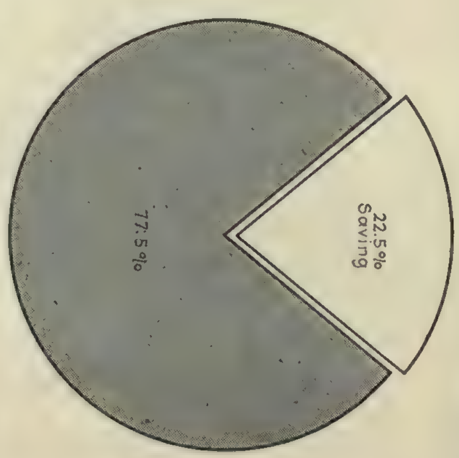
a One-man operation. *b* Two-man operation. *c* Partly one-man operation. *d* Approximately 20 per cent one-man operation. *e* Approximately 33 per cent one-man operation. *f* Approximately 50 per cent one-man operation. *g* Approximately 75 per cent one-man operation. *h* Approximately 85 per cent one-man operation.
* Depreciation included. † Depreciation not included

improved equipment on the modern cars. A material reduction has been made also in the way and structures expense because of the less destructive effect on track. As it happens, there has been some slight increase in the traffic account and a slight reduction in the general and miscellaneous account, but these changes are not directly connected with the types of cars operated.

Cross-Section of the Industry Represented

Railways comprising the group of twenty progressive companies were selected carefully to include the greatest possible variety of operating conditions so that the average would represent an accurate cross-section of the industry. Boston and Pittsburgh typify the large cities, the railway in each of these places serving a population of well over a million people. The systems in Providence and Houston are examples of operation in communities of between 100,000 and 500,000 population. The Coast Cities, Poughkeepsie, Zanesville and Bangor railways represent smaller city properties.

Among the interurbans the Buffalo & Erie Railway is in the 100-mile class. The New Haven & Shore Line Railway and the Warren & Jamestown Street Railway, on the other hand, are comparatively small properties. A number of the companies operate both city and interurban service. Such are the Kentucky Traction & Terminal Company, the Aurora, Elgin & Fox River Electric Company and the Morris County Traction Company. Thus among the twenty properties may be found nearly all types of electric railway operation. Despite the wide diversity of conditions, however, every one of these companies has shown substantially lower expenses.



Reduction in operating costs of twenty electric railways due to modernization of equipment

What the Individual Companies Have Done

Detailed figures for the individual railways are given in Table III. While these figures have been developed in the same general way for all companies, the existence of certain differences in accounting practices and, even more important, considerable fundamental differences in operating conditions, tend to make comparisons between companies somewhat misleading. Comparisons between present and former costs on the same property, however, are entirely fair and show in a convincing manner the good effect of the new cars.

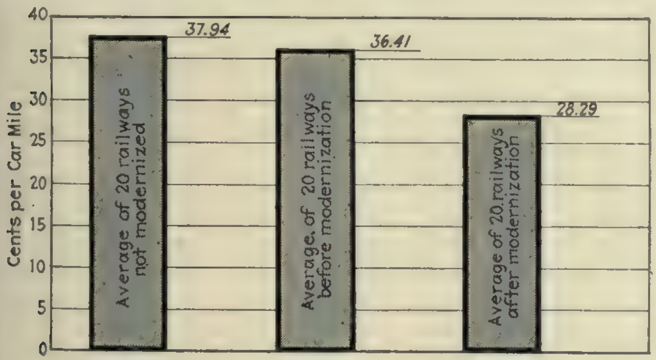
Within the scope of this survey it is possible to summarize only briefly the results that have been attained by the individual companies. Many articles have already been published in ELECTRIC RAILWAY JOURNAL describing the modernization of these properties. For reference purposes the dates of these articles are given in an accompanying table.

Index to Articles on Modernization of Railways Included in Survey

	Date of Issue	Page
Beaver Valley Traction Company	June 26, 1926	1086
Buffalo & Erie Railway	Jan. 6, 1926	58
Coast Cities Railway	Dec. 12, 1925	1023
Cumberland Traction Company	Jan. 23, 1926	144
	June 26, 1926	1086
Interstate Street Railway	Aug. 29, 1925	321
	April 24, 1926	719
	June 26, 1926	1086
Kentucky Traction & Terminal Company	Sept. 1, 1923	327
Lewistown & Reedsville Electric Railway	June 26, 1926	1086
Milford & Uxbridge Street Railway	May 9, 1925	726
	June 26, 1926	1086
Morris County Traction Company	May 1, 1926	763
New Haven & Shore Line Railway	Sept. 6, 1924	343
Ohio Valley Electric Railway	July 5, 1924	3
	June 26, 1926	1086
Pittsburgh Railways	Sept. 12, 1925	394
	Oct. 17, 1925	664
	June 26, 1926	1086
Southern Ohio Public Service Company	Mar. 6, 1926	396
United Electric Railways	June 26, 1926	1086
Warren & Jamestown Street Railway	June 26, 1926	1086

Boston Elevated Railway—During the past five years the Boston Elevated Railway has been making steady progress in the modernization of its rolling stock. More than 800 new cars have been placed in service. At first the light-weight cars were used principally on routes in the outlying districts, but more recently their use has been extended to lines operating in the heart of the city. While it is difficult to show by cost statistics the actual economies which have resulted from the use of modern cars, it is clear that there have been substantial savings. Comparing the operating expenses for 1920 with those for 1925 there has been a reduction of $1,363,387. The cost per revenue car-mile has been reduced by 6.24 cents. In the opinion of Edward Dana, general manager, the use of modern cars has contributed materially to this improvement.

Pittsburgh Railways—Another company which has made notable progress in modernizing its rolling stock is that at Pittsburgh, winner of the Charles A. Coffin prize in 1925. Early in 1914 the Pittsburgh Railways began the operation of modern, light-weight, low-floor cars. Additional cars have been purchased practically every year since that date. The present replacement program contemplates the retirement in the near future of all old and heavy equipment.



Comparison of operating costs on railways with and without modern rolling stock

At present there are 795 low-floor cars in service, approximately 500 of which have been acquired during the past four years. To fill the base schedules on the 100 lines operated 494 cars are required. Thus the railway has sufficient modern equipment to cover all needs in non-rush hours. New rolling stock and improved operating methods have reduced costs to a marked extent. The comparison given in Table III between 1920 and 1925 is a striking example of what can be accomplished by retiring old equipment.

United Electric Railways — Early in 1922 a modernization program was begun by the United Electric Railways, Providence, R. I. At that time 25 Birney cars were placed in service. About the middle of the next year 150 one-man, two-man cars were added. In addition, 35 double-truck cars were received in June of the present year, making a total of 210 new cars now in operation. Of the 222 cars required for the present base schedules 134 are one-man, 88 are two-man operated. Approximately 54 per cent of the total mileage is operated with one-man cars.

Although it is somewhat difficult to give definite figures of savings in equipment, power and platform expense which may be credited to the new cars, there is no question but that these accounts have been materially reduced and better service provided.

Houston Electric Company—Between the first of 1920 and the end of 1925 the Houston Electric Company bought 75 new cars. Their lighter weight has reduced substantially the expenditures required for way and structures. Maintenance of equipment costs less than formerly, and important savings have been made in conducting transportation. In 1921 this company had approximately 50 per cent one-man operation, whereas in 1925 this had been increased to more than 88 per cent.

Coast Cities Railway—Another transportation company which has accomplished substantial savings by the operation of new cars is the Coast Cities Railway, Asbury Park, N. J. Figures of this company show a reduction from 27.96 cents per car-mile in 1924 to 25.63 cents per car-mile for 1925. It is the opinion of L. F. Gillett, superintendent of transportation, that the maintenance of equipment costs show most plainly the savings of new cars against old. The way and structures costs do not show much difference because deferred track maintenance has not yet been entirely made up. Energy costs per car-mile show a slight increase with the new cars on account of additional heaters having been installed. "On the whole operation, however," Mr. Gillett says, "we show a decrease for the two years, and as we are constantly making improvements in our operation and equipment we are gradually reducing the cost of operation. Outside of the reduced platform expense due to one-man operation we are thoroughly convinced that new, modern equipment will effect a large saving from the old type of car."

Ohio Valley Electric Railway—During the latter part of 1923 the Ohio Valley Electric Railway made a complete replacement of all its rolling stock on the lines operated in Huntington, W. Va.; Ashland, Ky., and the suburban route between the two cities. The property comprises 46 track-miles, serving a population in excess of 150,000. Forty light-weight cars now give practically the entire service. The old rolling stock which they replaced consisted of four single-truck, fourteen double-truck, two-motor cars and 33 double-truck, four-motor cars.

With modern cars it is possible to maintain the same headway with two less cars on the Huntington-Ashland suburban line. Operating figures for 1925 compared with those for 1923 show a saving of $76,140. The economy of the new equipment has allowed the management to operate at a profit.

Poughkeepsie & Wappingers Falls Railway—On this railway, operating four local lines in Poughkeepsie, N. Y., and one interurban, only one old car is now in service. Modernization of equipment began in 1919 with the purchase of two double-truck cars. In the years 1920-22 seventeen Birney cars were bought, and two additional double-truck cars in 1924. A substantial reduction in operating expenses has been effected thereby.

Southern Ohio Public Service Company—Reduced cost of power has been one of the outstanding results of modernization of rolling stock of the Southern Ohio Public Service Company at Zanesville. Twenty new single-truck cars were placed in service in 1925. According to John W. Hewitt, general superintendent, with the advent of light-weight cars it has been possible to reduce the number of rotary converters from four to three. Power demand has decreased 150 kva., which at the rate of $2.50 would amount to $350 per month. In addition to this there has been a material saving in energy consumption.

"To the operation of the light-weight cars we were compelled to add several of the old type four-motor cars so that the comparisons made between 1924 and 1925 operations are not strictly for the old cars and the new cars, but for combinations of the old and new," he says. "In 1925 we operated 814,839 car-miles and used 2,444,517 kw.-hr., whereas in 1924 we used 3,701,749 kw.-hr. for 785,934 car-miles. The kilowatt-hour rate per car-mile was 4.71 in 1924 and only 3 last year."

Bangor Hydro-Electric Company—Up in the extreme northeasterly corner of the United States, at Bangor, Me., the railway was one of the first to undertake to modernize its equipment. Birney cars were first bought in 1916 and since that time light-weight, double-truck cars have been procured to replace old, heavy equipment. The savings resulting from this modernization are shown in Table III. These give only a general idea of the result of modern car operation as the costs are not kept separately for old and new rolling stock. Reduction in the cost of power is due in part to a change in accounting practice.

Interstate Street Railway—On the Interstate Street Railway, Attleboro, Mass., five double-truck and three single-truck, light-weight, one-man cars were purchased in 1925 to replace the 45,000-lb. type previously in use. Schedule speeds have been increased so that one car has been eliminated. This has been due primarily to better line voltage and faster passenger interchange, due to the lighter, low-wheel cars. On account of the lessened repair work with the new cars, there has been a reduction in the shop force, and the total expense per car-mile has gone down from 37.75 cents to 26.10 cents. The result of modernization has been to change the status of this transportation company from bankruptcy to prosperity.

Cumberland Traction Company—In the little town of Bridgeton, N. J., is located a small size electric railway which has been saved from the junk heap by modernization of rolling stock. Reduction in costs resulting from the operation of new light-weight cars

At Zanesville the new single-truck cars of the Southern Ohio Public Service Company have made substantial savings

has made it possible to continue railway service in this thinly settled territory.

Kentucky Traction & Terminal Company—In 1922 all interurban lines were re-equipped using twelve light-weight, double-truck cars. The following year 27 cars were bought for passenger service in Lexington. In 1924 two cars were acquired for Frankfort and in 1925 seven cars for Pomeroy. This new rolling stock has proved so satisfactory that today the management would not accept heavy cars as a gift.

Buffalo & Erie Railway—Success of the Kentucky property, under the same management, led to complete replacement of old, heavy equipment by eighteen modern light-weight cars. This has proved to be a profitable investment on the Buffalo & Erie Railway, Fredonia, N. Y. Economies resulting therefrom have been so marked that the condition of the property too has been converted from insolvency to prosperity.

Aurora, Elgin & Fox River Electric Company—In 1923 the Aurora, Elgin & Fox River Electric Company, operating the railway system in the Fox River Valley of Illinois, bought 47 new cars, thereby providing enough modern equipment for all base service. Operating expenses have been materially reduced from the level prevailing when all heavy cars were in service.

Morris County Traction Company—Light-weight cars, both single-truck and double-truck, have been a substantial aid to the management of the Morris County Traction Company, Morristown, N. J., in its endeavor to reduce operating expenses. While the new equipment represents only a comparatively small part of that required to fill the schedules, important savings have been accomplished and the volume of traffic has increased considerably.

New Haven & Shore Line Railway—After a lapse of years, during which no service was given, operation was resumed with new cars on the 37-mile New Haven & Shore Line Railway in the summer of 1924. Due largely to the economies resulting from this modernization the operation has continued on a paying basis since that date.

Milford & Uxbridge Street Railway—Substantial savings have been made on the Milford & Uxbridge system, serving a group of Massachusetts towns southwest of Boston, by the introduction of new, light-weight cars. Old cars are still in use for tripper service, but on the interurban line between Framingham and Milford the new cars are used exclusively.

Beaver Valley Traction Company—In the retirement of old cars and making replacements with modern types the Beaver Valley Traction Company has been very active. Modernization began in September, 1920. At this time, and in August, 1921, twenty standard safety cars were purchased. In November, 1923, six modern light-weight, double-truck cars were added. These cars replaced 36,000-lb. double-truck, semi-convertible cars. Results have been so good that it is felt by the management that without the use of modern cars and a change to one-man operation it would not have been practicable financially to continue operating the property.

Warren & Jamestown Street Railway—Results with modern cars have been very satisfactory on the Warren & Jamestown Street Railway, both from a financial and an operating standpoint. The property consists of a 22-mile interurban line between the two cities. The former rolling stock on the interurban lines consisted of five double-truck cars weighing 50,000 to 60,000 lb. complete. These cars were eighteen to twenty years old. In 1923 three modern light-weight, low-floor cars weighing 36,000 lb. complete were purchased to improve service and reduce operating cost. There has been a reduction in expense of 41 per cent. With the new cars and operating economies it has been possible to reduce expenses sufficient to keep the property on a paying basis.

Modern light-weight surface cars of this type have been instrumental in reducing the operating costs of the Boston Elevated Railway

FINANCING OF NEW CARS

made possible by the savings effected

By L. R. NASH
Vice-President Operating Division, Stone & Webster

The public judges electric railways by the appearance of their equipment—Its modernization is the most pressing problem today —Savings from new cars will pay their cost and will provide a substantial balance

L. R. NASH

EXPERIENCES of the electric railways during the past dozen years with competition from jitneys and buses and the phenomenal increase in motor vehicles led, among other things, to an impairment of the credit standing of the industry. When one considers the increase in private automobiles during that period, from about two million to nineteen million, it would not have been surprising if the results had been far more serious. During the last year or two the industry has experienced a noteworthy improvement in morale and a determination to reassume with renewed vigor the obligations of urban transportation in whatever form desired. The improvements in equipment and service on such properties as the North Shore and Aurora-Elgin, operating interurban lines out of Chicago, and the Grand Rapids city lines give striking evidence of such revival. It is, nevertheless, discouraging to see so many financial circulars and advertisements pointing out directly or indirectly the comparatively small part, if any, which transportation plays in the operations of the utilities whose securities are offered.

ROLLING STOCK PRESENTS PROBLEM

Due to their impaired credit and the necessity of making substantial improvements in their properties if business which has been lost is to be regained, electric railways now find themselves in a doubly embarrassing position. Electric railway property may be roughly divided into three groups: Power supply and shop facilities; roadbed; rolling stock. Only the last-named group receives significant public attention. If track is reasonably smooth and power supply free from interruption, these factors are not noticed by the traveling public. On the other hand, they come in frequent daily contact with rolling stock, and ancient and poorly maintained cars not only invite unfavorable comment but also discourage traffic. Recent surveys indicate that about one-third of the passenger cars now in service on electric railways in the United States are more than twenty years old. Based on purchases of new cars in the earlier and more profitable years, it is estimated that there has been in subsequent years an annual deficiency in purchases of something like 1,500 cars. It is obvious that traffic cannot be stimulated by rolling stock of this character even with costly maintenance expenditures.

The pressing problem of the railways is, therefore, the modernization of its rolling stock, and it is the opinion of the industry's leaders that this modernization must be accomplished in spite of difficulties attending its financing. Few electric railways have adequate retirement reserves. In the early years of the industry the need of such reserves was not clearly appreciated or their accumulation was postponed to subsequent years which were expected to be more prosperous. Obviously, in recent years the net income of the business has not been sufficient to permit adequate appropriations. The need of retirement reserves exists not only to write off obsolete rolling stock but also to provide for the abandonment of trackage and substitution of bus service in the many cases where light traffic or impending paving requirements make bus service more profitable. The solution of this difficulty is not yet clear, although, as will appear, there are hopeful aids to its solution.

In view of the fact that the power facilities and trackage of electric railways do not need substantial expansion, the financing problem under consideration narrows down to that of providing new, efficient and attractive rolling stock. The physical as well as the financial aspects of this problem are having careful attention and many interesting and surprising facts were embodied in the recent report of the American

Electric Railway Association committee on essential features of modern cars. It might profitably be studied not only by electric railway officials but by investment bankers and their clientele. The report emphasizes the obvious fact that standardization of design would result in lower costs and more speedy delivery of rolling stock, and outlines in some detail the proposed plans for such standardization. It then presents in considerable detail the savings which have been effected on a number of properties where modern, light-weight cars have been substituted. The major part of the properties in question operate interurban service where the advantages of the recommended reduction in weight of rolling stock are most pronounced, but the gains from modern equipment on urban properties are also shown to be attractive.

WHEN one considers the increase in private automobiles during that period from about two million to nineteen million, it would not have been surprising if the results had been far more serious. During the last year or two the industry has experienced a noteworthy improvement in morale and a determination to reassume with renewed vigor the obligations of urban transportation in whatever form desired.

Obviously, new cars require comparatively small initial maintenance, but even their ultimate maintenance will doubtless be less than that on the older equipment, and the upkeep of roadbed, shops and other facilities will also be permanently less because of reduced car weight, all in addition to savings in platform wages, power cost and other operating items. It appears from detailed figures, assembled from a wide range of properties, that modern cars will save enough in operation not only to pay their carrying charges, but to leave a substantial balance for amortization of superseded equipment. In fact, in some cases this superseded equipment can be written off in a surprisingly brief period of years, the saving in operating costs being from 15 to 50 per cent or more on the added investment. This showing is made in most cases without allowance for increase in traffic which the new cars stimulate, and there is abundant evidence that the number of new riders attracted by more modern cars is substantial.

As soon as such improved showing permits, the railways should give serious attention to more adequate provisions for depreciation. As already stated, past provisions have been inadequate, and service and efficiency have thereby suffered. In its future more liberal provision for this element in the cost of service to be recovered through fares, the industry should not itself be deceived or permit regulatory authorities to be misled by past history of retirement costs. Other classes of utilities have developed a habit of using carefully prepared records of useful life history as the basis of future provisions for depreciation. Our industry has voiced its general opposition to this procedure because of the local character of its property as compared with interstate agencies and the widely varying effect of climatic conditions, governmental requirements, changes in the art and public tastes and demands.

Even if useful life were recognized as a factor, past experience is not a safe guide. More than one-third of the cars now in use are over twenty years old. Here is an obvious deficiency in past retirement costs. Track has also failed to receive needed attention, and there are many cases of power station investment still retained on the books, although power is regularly secured from other sources. All these deficiencies in past retirement charges should be clearly understood in estimating future appropriations. Even if past shortages cannot be promptly overcome, future appropriations should recognize the rate at which past appropriations should have been made rather than the retirement costs which the books actually show. There are doubtless cases where now and for some time in the future the maximum rate of fare which either regulation or business judgment dictates is too low to cover the full cost of service. Such full cost should, nevertheless, be known, including provision for retirements based upon recognized normal requirements rather than past history. It should also take into account the probable increase in use of buses and accompanying release from service of other types of rolling stock.

THE pressing problem of the railways is, therefore, the modernization of its rolling stock, and it is the opinion of the industry's leaders that this modernization must be accomplished in spite of difficulties attending its financing. Few electric railways have adequate retirement reserves. In the early years of the industry the need of such reserves was not clearly appreciated or their accumulation was postponed to subsequent years which were expected to be more prosperous.

Fortunately, the financing of new rolling stock purchases has been made comparatively simple in recent years through co-operation of manufacturers and their banking affiliations, and cars may be purchased through installment payments under the equipment-trust plan in common use by steam railroads. Under such plan payments are commonly spread over a period of five years or thereabouts, and there have been numerous cases where savings in operation have been more than sufficient to provide the necessary installments. Where bus service can advantageously be substituted for rail service, the purchase of buses many also be made on similar terms.

It may be objected that additional financing under the equipment-trust plan is undesirable in that it adds further obligations to a financial structure already heavily overloaded with debt. For more than ten years junior financing by electric railways has been negligible, and the new obligations incurred for added facilities, although in comparatively moderate amounts, have made the financial structure less stable and have contributed to the collapse of a number of such structures.

The report of the advisory committee on electric railway finance, presented to the American Electric

Railway Association at its 1925 convention by a committee representing primarily the investment banking interests, clearly pointed out the dangers in the existing financial situation and its tendencies. This advisory committee demonstrated, through carefully prepared figures covering a projected period, assumed to represent a continuation of present financing policies, that the financial structure of the industry as a whole would steadily weaken, as shown by the margins over interest and the ratio of net income to dividends.

The committee then proposed a voluntary revision of the capital structure, under which a substantial proportion of outstanding obligations would be converted into preferred stock, dividends on which would equal interest charges on the bonds replaced. The immediate effect would be relief in an appreciable number of cases from danger of receivership, a higher credit standing of the bonds remaining and a better market for such new bonds and preferred stock as might from time to time be issued.

The advisory committee recommended that a substantial part of new financing after such reorganization be done through preferred stock sales. For obvious reasons customer ownership, so popular in the electric power, telephone and gas industries in recent years, has made little progress in the railway field, and there has as yet been little opportunity to test the recommendations of the committee in this respect. It does not, however, appear that the confidence of the committee that the customer-ownership movement should find representation in the electric railway field was wholly premature or misplaced. Recent sales of junior issues by well-known electric railways indicate improved investment sentiment.

AS SOON as such improved showing permits, the railways should give serious attention to more adequate provisions for depreciation. As already stated, past provisions have been inadequate and service and efficiency have thereby suffered. In its future more liberal provision for this element in the cost of service to be recovered through fares, the industry should not itself be deceived or permit regulatory authorities to be misled by past history of retirement cost.

It may be of interest to those who have not read the advisory committee's report to point out the results which it gives in a ten-year period of future operation under a revision of the financial structure which converted 25 per cent of its debt into preferred stock. During this period, with normal growth in income and investment, interest charges are shown to have been earned at least twice, and also preferred dividends with a constantly increasing margin, the ratios of net income to preferred dividends ranging between 3.0 to 1 and 2.2 to 1. According to investment bankers' standards, both bonds and preferred stock under such conditions should find a ready market in the absence of surviving prejudice. The author has had occasion to criticise these methods of testing investments and has suggested what seems a more logical alternative or, at least, a desirable supplementary check by showing the relation of the balances available for interest or dividends to the annual revenues. Where revenues are subject to substantial change without corresponding change in operating expenses, the available balances may be dangerously reduced, although the number of times interest is earned may appear safe.

Under this alternative method of testing the attractiveness of the revised capital structure proposed by the advisory committee it appears that the gross income available for bond interest is about 25 per cent of the probable operating revenues at the end of the ten-year test period and but little less at the beginning, a wholly satisfactory ratio. Net income available for preferred dividends increases roughly from 12 to 13 per cent of operating revenues, a not wholly satisfactory showing if the financial history indicates lack of stability in income, but suitable for many investors.

Although the balance left for common dividends shows a material increase in dollars and in percentage on a fixed outstanding issue, it actually decreases during the period in per cent of operating revenues, indicating that at best the prospects of common stocks of electric railways as investments, as shown by the report of the advisory committee or elsewhere, are not yet encouraging. In spite of this fact, the availability of preferred stock under a reorganization plan, of equipment-trust certificates, and of some further issues of longer term obligations for income-producing facilities, such as have been referred to herein, gives the industry a sufficient field for its current financing. Common stock financing may safely await a future date when co-ordination of transportation agencies, improvement in equipment and more logical fare structures have brought about, as they undoubtedly should, a substantial and permanent improvement in the financial standing of the industry.

The difficulties attending voluntary reorganization of a solvent railway property are apparent. The holders of undefaulted obligations naturally hesitate to exchange them for even a cumulative preferred equity. When, however, the future holds possibilities or prospects of decreased market value of their holdings or failure to meet interest payments, such holders may well consider the alternative, offered through reorganization, of equal income regularly or cumulatively received without legal formalities unless further serious reverses are encountered, with the further inducement of probable increase in market value. Increased experience with involuntary readjustments of capital structures may in time furnish the best argument for similar voluntary action in certain cases.

Under the conditions above outlined the outlook for the industry is by no means discouraging. It can finance rolling stock purchases in a comparatively simple way at rates of interest which are by no means exorbitant. Other kinds of railway property do not in general need important expansion. New rolling stock will attract new business, which the industry needs for permanent improvement in its showing, and will also reduce operating costs. It may require courage in many cases to add, if necessary, to an already embarrassing series of obligations, but where such addition will reduce the cost of service, as indicated by recent experience, that courage should be mustered.

All P.-O. Divisions Are Now Self-Sustaining

By R. N. GRAHAM
Manager of Railways
Pennsylvania-Ohio Electric Company
Youngstown, Ohio

Pennsylvania - Ohio Electric Company, from a low ebb in 1920, first won back its traffic from bus competitors by operating de luxe coaches — Attention was then turned to rebuilding its railway business —Average age of all cars now operated is only six to seven years

A CYCLE of six years in the operation of the Pennsylvania - Ohio Electric Company has proved that there is no popular "rubber urge" that dooms rail operation. The private automobile is the chief competitor and a modernized public transport system of cars and coaches is the best weapon with which to combat this competition. Today the company's operations are producing a substantial net return on all divisions. Operations cover three distinct fields. The Youngstown Municipal system exemplifies combined bus and rail service in a city of 165,000 population. Small city operation is illustrated by the towns of New Castle, Warren and Sharon, having populations of 60,000, 40,000 and 25,000 respectively. The three interurban lines connecting Youngstown and these small cities typify the short interurban of 20 miles.

During the last six years these rail lines have been rejuvenated a short time after the establishment of high grade de luxe motor coach service. The latter led off by a year or more and cut heavily into the rail receipts, but at the same time struck a deathblow to the small independent bus operator.

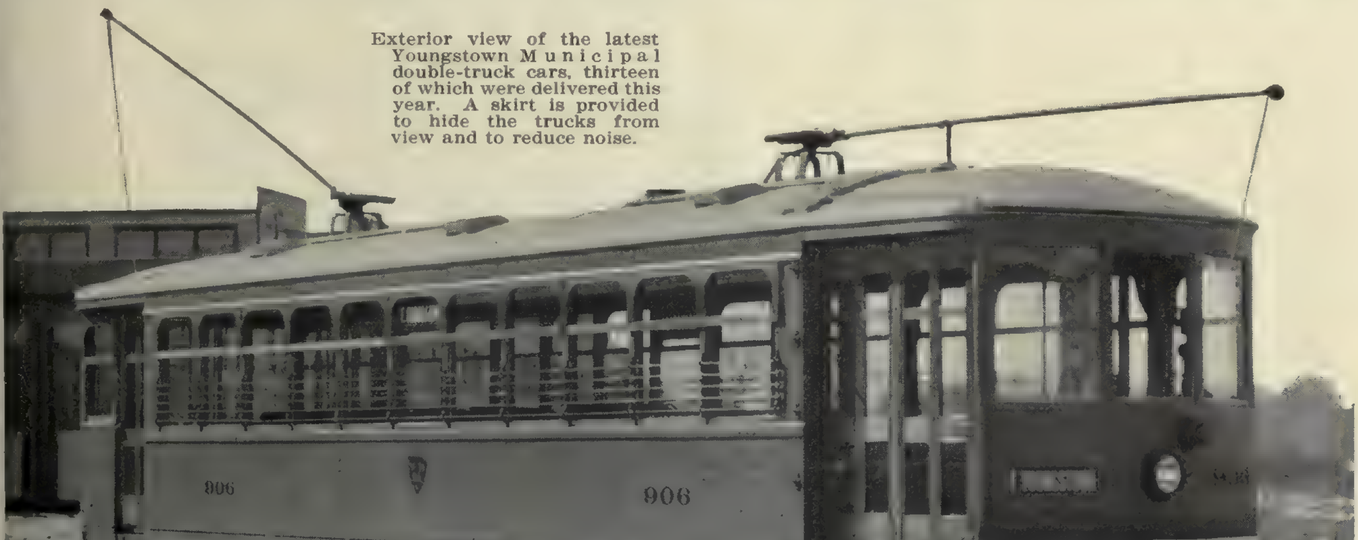
Then followed the rehabilitation of the rail routes and the advent of new cars built for a new service. With two high-grade services being furnished a shift back to the rails was seen, so that now we feel that a definite balance has been reached. Some of the through traffic prefers the slightly faster service of the coach despite the 50 per cent higher fare, while the interurbans have built up business lost years ago and have taken some that went to the buses and coaches when the cars of ancient vintage fell into disrepute.

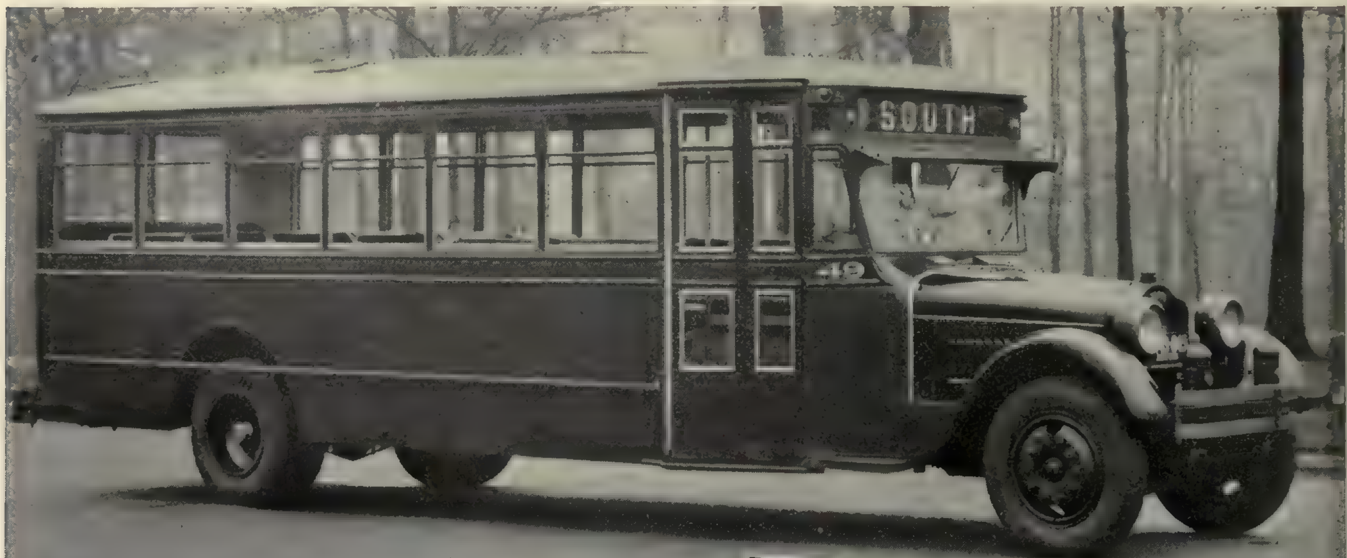
At present the average age of all cars operated outside of Youngstown is less than six years. Only seven cars out of 83 were in use prior to March 1, 1918, and these only in tripper or extra service. Even these have been rebuilt for one-man operation. On the Youngstown Municipal the average age of cars is less than seven years.

Rehabilitation Required Six Years

Black ink was first used in 1923 to write the net after taxes of $7,063 on the Youngstown Municipal. In 1924 the net was $80,000. In 1925 this was $119,821, and beginning with May, 1926, the net return exceeded that allowed by the 1919 franchises.

On railway lines outside of Youngstown the corner was turned in 1924 with an operating net of $38,910.


Exterior view of the latest Youngstown Municipal double-truck cars, thirteen of which were delivered this year. A skirt is provided to hide the trucks from view and to reduce noise.



Youngstown Municipal and P.-O. interurban coaches were designed to render a modern service

At top—Bender bodies on White chassis are used.

Second view—Looking forward in the aisle of the de luxe coach. Operator's position is designed to allow easy access to all parts of the equipment.

Third view—Seats are comfortable and roomy and window space is ample in the Pennsylvania-Ohio de luxe coaches.

At bottom—Looking forward in the Youngstown Municipal city type coach a passenger has an unobstructed view. The wire-glass screen protects the operator from passengers who might lose their balance while passing to and from seats and avoids interfering conversation from passengers occupying the front seats.

The year 1925 produced a net of $168,525 after operating expenses, or 4.5 cents per car-mile.

About 1920 the railway lines of the Pennsylvania-Ohio Electric Company were at their lowest ebb. The wild jitney craze was at its height, the cars, tracks and other facilities of the railway property were none too good and the public relations that followed in the wake of such service were not all that might be desired.

Since that time our company has completed a cycle in the revamping of its transportation systems. The first thing to be tackled was the establishment of the motor coach business between Youngstown and the three major towns served by this company's interurban lines — Warren, New Castle and Sharon. With the advent of the de luxe coach, inaugurated first by the company on the Warren line in August, 1922, the bus competition was rapidly conquered. Many independent operators, not

Growth in Revenue and Net in Five Years for All Transportation Agencies Operated by Pennsylvania-Ohio Electric Company

	Gross Revenue	Net Before Taxes	Revenue Passengers
1921	$3,049,269	$7,917	32,236,873
1922	3,092,014	272,742	38,147,270
1923	3,352,312	352,581	43,656,226
1924	3,794,510	373,860	42,047,120
1925	3,943,324	729,536	43,333,133

too well founded financially, disappeared in an incredibly short time, while others were later bought out at reasonable figures.

Although our de luxe motor coach rates were approximately 50 per cent higher than those of the paralleling railway lines, the latter business was affected seriously. Many at that time thought they saw the passing of the railway. We, however, saw in it an opportunity. Even with the difference in fares between the rail route and the motor coach route there was no comparison in the quality of service rendered.

De luxe coaches used on the interurban lines of the Pennsylvania-Ohio Electric Company of Youngstown, Ohio

In September, 1923, therefore, this company purchased twelve interurban type cars fitted up with the same degree of comfort as the coaches and embodying all of the modern devices useful in our situation. In the years following four other interurban cars of the same type were purchased and twelve others, purchased in 1918, were remodeled.

During this period the Youngstown district has witnessed the same enormous growth in private automobiles that has been experienced in nearly all other communities. Without question, we consider the private automobile the one greatest competitor to public carrier transportation. Improvement in the interurban railway gross revenue has been a check to the constant decline experienced in earlier years and one that on some interurban properties has continued to the present date.

Front end of new Pennsylvania-Ohio Electric Company interurban car, showing neat inclosure for controller, motorman's air brake valve and other apparatus. Note the air-operated window wiper

De luxe coach operation, maintained for four years since its start on the Youngstown and Warren line, has lost revenue of late to the new cars on the railway lines. These coach operations, however, have been coupled with other coach subsidiary companies into a network covering 340 miles of highway routes and are earning a good return. Operations have settled down now to what we consider a balanced division between rail and coach service. The coaches largely serve in the hauling of through business from terminal to terminal, making faster time than the electric cars operating in greater congestion and at a fare about 50 per cent greater. The intermediate local business has largely fallen to the modern de luxe cars.

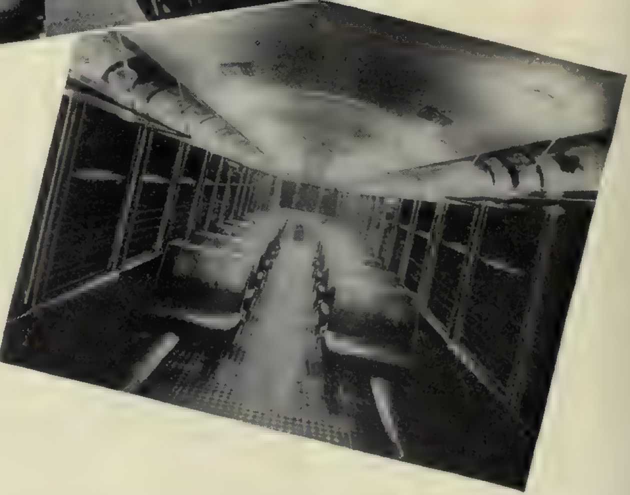
Distinct improvement in net revenue has resulted from the greater economies made possible by these cars. Such economies arise chiefly from the fact that all interurban as well as city cars are operated by one man and, due to their lighter weight and modern features, require less power and less maintenance. In all cities requiring paved tracks the light-weight cars permit the use of a lighter rail and sub-base construction, making a saving of $13,400 per mile in track reconstruction cost. Our present paved track is built with 103-lb. girder rail, which was substituted for the 134-lb. girder rail. Our standard construction is to use International Steel ties with 4 in. of concrete under the plates. The use of Elastite fillers makes quiet running track and the thermit welded joints have stood up well and the lighter track construction has proved very satisfactory. The small number of broken joints in these lighter tracks is perhaps an indication of the success of this policy. Among 1,800 thermit welds in this type of track we have experienced but seven broken joints.

Part of the credit of our reduced accidents can be attributed to the safety equipment and part to our closer inspection and better training of operators. Accidents have been reduced due to all these causes, as shown in the accompanying table.

Following the service-at-cost franchise passed in January, 1919, the municipal rail operations went steadily backward. For only two individual months prior to 1926 did these lines earn the allotted 7 per cent return on the property valuation agreed upon with the city. Beginning in May, 1926, with the completion of the installation of modern cars and 100 per cent one-man operation, the red figures disappeared and we expect them never to return. The accumulated deficit, however, during this period has been $1,600,000.

Interurban cars of this type, operating between Youngstown and Warren, New Castle and Sharon, have won back a large volume of traffic to the rail lines

Showing comfortable seats with ample spacing in new interurban cars operated by Pennsylvania-Ohio Electric Company. Single sash windows are used. No advertising, signs or cards are seen within these finely appointed cars



Interior view of the new Youngstown Municipal cars at night. Time exposure with only the illumination of the interior lights. The system of lighting installed in this new group of cars consists of twenty 30-volt lamps in series

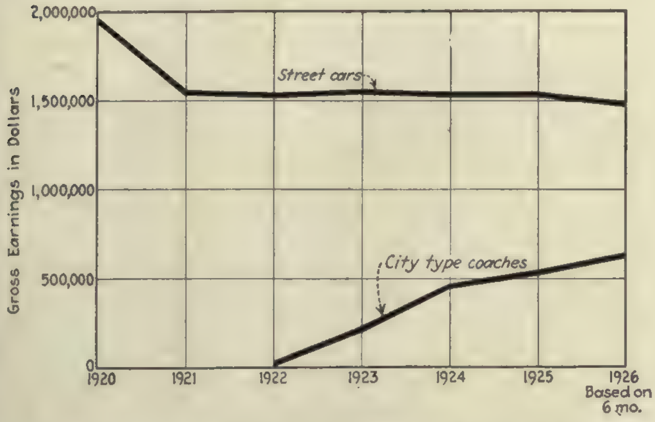
While it will take many successful years to wipe out this deficit, much gratification results from the definite upward trend of net revenue.

Even with 3½ miles of tracks abandoned, nearly the same mileage is operated as in any of the past six years. In addition to the rail service there has been a steady increase in service by coaches, so that now 35 per cent of the total vehicle-miles in Youngstown is performed by city type coaches. The combined rail and bus passengers carried have increased more than 21 per cent since 1922.

Besides the Youngstown Municipal territory under service-at-cost operation, this company supplies local transportation in the three smaller cities of New Castle, 60,000; Warren, 40,000; Sharon, 25,000. The operations in these smaller cities are included in the operating costs and expense of what we call lines outside of Youngstown. In these cities combined rail and coach operation is now successful. In all, operation over about 4 miles of track has been suspended in these smaller cities and eighteen route-miles established as coach operations co-ordinated with the rail routes.

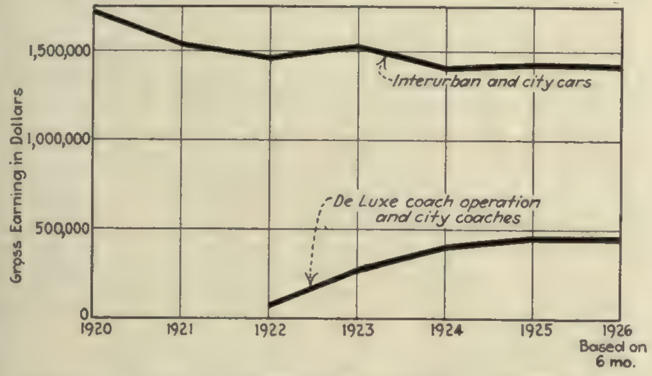
MAJOR DETAILS THAT ACCOMPLISHED RESULTS

From the time immediately following the service-at-cost franchise, operations of the Youngstown Municipal were carried on separately from those of the other companies. Late in 1925 this practice was discontinued by common consent of the Youngstown Municipal authorities and officials of the Pennsylvania-Ohio Electric Company. While accurate figures are kept of these two major accounts, the operations are carried on as if they were one. At the present time all of the car maintenance is accomplished in the Youngstown Munic-



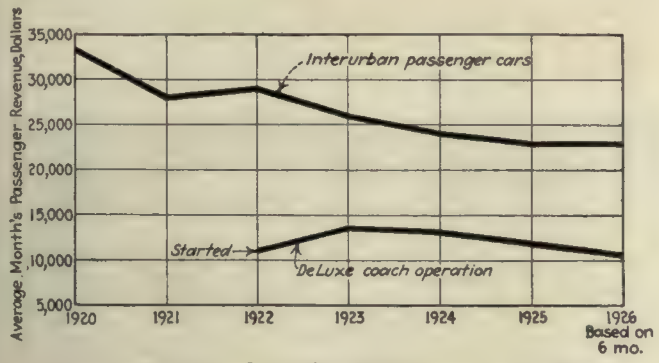
Gross earnings record in Youngstown for six years

For five years the Youngstown Municipal Railway has included increasing coach service, so that this now equals 35 per cent of the total supplied by cars and coaches. The railway gross has remained about constant. Apparently it was more service and not a different service that wanted.



Gross earnings for Pennsylvania-Ohio rail and coach lines outside of Youngstown

With new cars in operation for the last few years, there has been a tendency toward an increased gross and a falling off in coach revenue, comparing the rail and coach service that essentially parallel each other. The coach lines have been extended to Akron, Meadville and Cleveland, beyond the railway terminals, so that the total coach revenue has increased. This chart shows only a comparison of the rail and coach service that operate essentially in the same territory.



Gross earnings of coaches giving way to railway

A direct comparison of passenger receipts for the average month of each year, or fraction as noted, shows the de luxe coach operation tending to give way to the new interurban cars on the paralleling routes. This is most pronounced on the Warren and Sharon lines. Coach service to New Castle has been running too short a time to make a reliable comparison.

ipal car shops at Youngstown except for such servicing and light repairs as are done to local or interurban equipment in the outlying small cities. All of the painting of cars and coaches is done in the well-equipped paint shop belonging to the Pennsylvania-Ohio Electric Company at Masury.

New cars have been fundamental in the progress made in lowering maintenance and operating expenses.

Average Age of Youngstown Municipal Cars Is Less than Seven Years

No.	Year Purchased	Seating Capacity	Classification
12	1912	48	300 (rebuilt in 1923–24)
15	1914	56	500
5	1914	58	500 (rebuilt in 1926)
13	1917	56	Peter Witt (rebuilt in 1924–25)
34	1921–24	32	Birney
13	1926	44	Double-truck city.

Average Age of Cars Outside of Youngstown Is Less than Six Years

No.	Year Purchased	Seating Capacity	Kind of Service	Company Classification
2	1902	38	Int.	120
5	1913	46	Int.	300
3	1918	64	Int.	650 (single end)
32	1919	32	City	Birney
5	1921	32	City	Birney
10	1921	64	Int.	660
5	1922	32	City	Birney
12	1923	48	Int.	700—de luxe
5	1923	32	City	Birney
4	1925	48	Int.	720—de luxe

Not only has the design of the new interurban cars reduced operating costs but the particular attention given to improvements in body details has been largely responsible for the increased patronage. We consider it a significant fact that these interurban lines, when given an opportunity to compete with new cars on a fair basis, can check the rapid growth of the de luxe coach revenue.

Major Expenditures for Track and Equipment Exceed $2,000,000 in Five Years

Tracks rehabilitated, including overhead:	Youngstown Municipal Railway		Pennsylvania-Ohio Lines	Total
1921	$31,427.90		....	$31,427.90
1922	61,476.00		$64,939.33	126,415.33
1923	49,879.75		121,404.98	171,284.73
1924	26,921.99		162,919.60	189,841.59
1925	....		92,104.72	92,104.72
Total				$611,074.27
New cars purchased:				
1921 (24 Birney)	$153,441.60	(5)	$34,917.70	
1921	....	(10)	185,028.79	$373,388.09
1922	....	(5)	31,948.86	31,948.86
1923	....	(12)	182,494.28	
1923	....	(5)	33,560 77	216,055.05
1924 (10 Birney)	45,913.28		....	45,913.28
1925	....	(4)	60,721.33	60,721.33
1926 (13 d. t.)	182,680.05		....	182,680.05
Total for cars				$910,706.66
New coaches purchased:				
1922 7	$42,276.18	(12)	$90,664.33	$132,940.51
1923 11	76,367.10	(7)	48,222.50	124,589.60
1924 13	93,106.24	(11)	77,645.77	170,752.01
1925 10	75,145.64	(5)	42,946.96	118,092.60
1926 10	72,554.14		....	72,554.14
Total for coaches				$618,928.86
Grand total for coaches				$2,140,709.79

More than $2,000,000 spent in six years to accomplish results, or three times the net before taxes earned last year.

The lower curve on this page shows a flattening out of railway gross revenue and a slight decrease in the gross revenue for all paralleling coaches. The individual divisions show this tendency more pronounced. As the division of business between coaches and cars

Effect of One-Man Operation on Number of Employees

	1921	1922	1923	1924	1925
No. of trainmen	273	240	227	201	159
Man-hours.....	755,223	664,094	640,305	519,629	474,464
Wages........	$460,420	$365,241	$382,050	$320,843	$294,168
Yearly wages per trainman.	$1,685	$1,685	$1,596	$1,596	$1,850

The reduction in personnel was taken care of by natural turnover except that a few men were furloughed for a short time.

Progress of One-Man Operation of Passenger Cars Outside of Youngstown

	Per Cent					
	1921	1922	1923	1924	1925	1926
Car-miles.................	27.2	53.5	57.2	84.5	97.6	100
Car-hours.................	35.8	50.0	64.9	83.1	96.0	100
Passengers on one-man cars	27.6	41.8	56.8	87.5	99.1	100

Chronology of One-Man Car Operation

1919—New Castle city division began operating one-man.
1920—New Castle and Sharon 100 per cent one-man.
1923—Interurban, except Girard, began September and was completed in October, 1924.
1925—All lines except in Youngstown were one-man operated and Youngstown completed during the year.
1926—100 per cent one-man operation.

Accident Record for Recent Years

No. of Reported Accidents:	1920	1923	1924	1925
Youngstown Municipal........	.....	2,223	2,017	1,968
Railways outside Youngstown..	1,768	.....	953	887
Chargeable accidents per 100,000 car-miles:				
Youngstown Municipal........	.....	54.0	50.0	49.0
Railway lines outside..........	36.6	.....	23.6	22.6

This again proves that one-man operation does not produce more accidents but actually fewer than on the old two-man basis.

becomes more stabilized we believe these results will be even more pronounced.

Operating costs before taxes for all of the cars outside of Youngstown have been cut from 35.6 cents per car-mile in 1924 to 32.5 cents per car-mile in 1925 and it is expected that a full year's operation under this new plan of maintenance will still further reduce this operating cost.

Ten new freight trailers have just been put in service. These cars are constructed on the standard specifications of the C.E.R.A. and are designed for interchange service on practically all of the interurban systems of the Middle West.

In the period from 1922 to 1925 operating costs, including maintenance, of the Youngstown Municipal cars have been reduced from 32.38 cents to 31.10 cents per car-mile. Youngstown is one of the largest cities to operate one-man cars having a seating capacity as high as 58 in service handling factory loads.

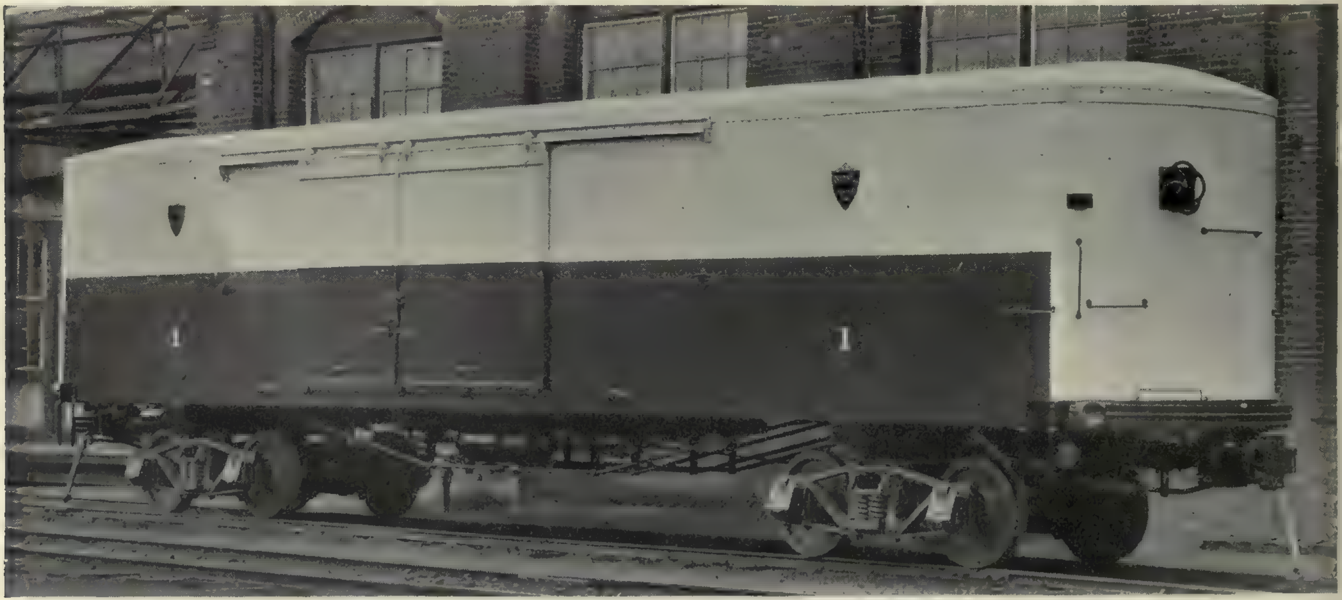
This company is rapidly coming to the use of pyroxylin enamel for the painting of all its equipment. At the present time 40 per cent of the cars and 70 per cent of the coaches have been painted in the company's shops by this process. Two men in one nine-hour day can repaint a Birney car or coach instead of requiring six days on the old paint and varnish schedule. Incidentally the materials used in this new process cost 40 per cent less. By using more men, cars and coaches could now be painted between the rush-hour peaks of the same day, were such speed necessary.

Coach operations for city and interurban work we believe to be firmly established as an adjunct to the railway service. Through these means we have regained traffic lost years ago. In addition these coaches have undoubtedly brought new business to the company from the field of the private automobile.

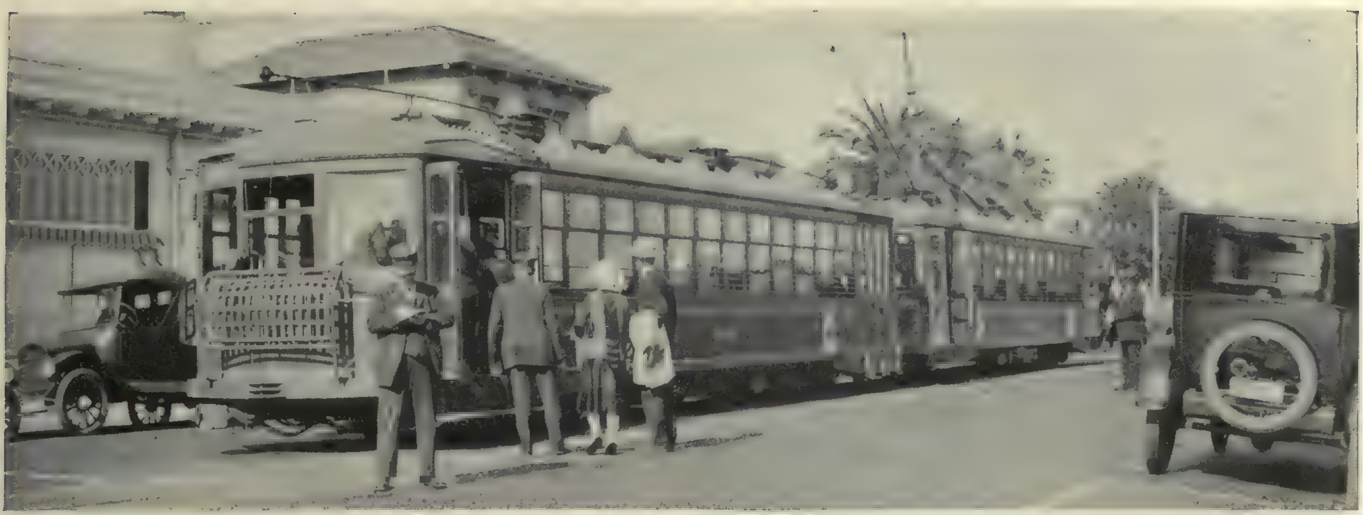
To care for the ever-increasing fleet of coaches a new garage has recently been constructed in Youngstown, in which repairs and inspections will be made in the future. The coaches can by this means be kept in much better condition and their life extended appreciably.

After four years of operation of the first de luxe type of Bender bodies on White chassis we have determined that the useful life can be extended through adequate inspection and care from four years, originally estimated, to at least five years. We have changed our accounting practice in conformity with this experience and are now setting aside 20 per cent of gross for renewals instead of 25 per cent as formerly.

Accompanying tables tell in considerable detail the progress produced by the improvements and the views illustrate the new type of equipment used.



One of ten standard freight cars recently put in service on the Pennsylvania-Ohio lines. These are designed to be interchangeable on all connecting electric lines in the Middle West



This equipment increased revenue a dollar per car-hour on one of the Key System Transit Company's lines

REVENUE INCREASED

by new cars on Key System

By GEORGE H. HARRIS

General Manager Key System Transit Company
Oakland, Cal.

CERTAIN very definite advantages have resulted from the operation of new cars on the Key System. Due to the use of modern motors the speed has been increased about 15 per cent over that of the old equipment. The consequent reduction in running time makes it possible to operate the same headway with fewer cars, thus effecting a substantial saving in costs. Operation of modern equipment has resulted in a considerable gain in traffic. On one of our trunk lines the revenue increased approximately $1 per car-hour after the line had been fully equipped with modern cars.

The type of car which has accomplished these results is designated as the 900 series and has been adopted as standard by the Key System Transit Company for all types of service in the East Bay cities. It is of steel construction, 45 ft. 6 in. long and seating 48 passengers. The weight is about 40,000 lb. Each car is equipped with four 40-hp. motors and is arranged for operation either as a one-man or two-man single unit or in two-car trains.

To accomplish quick results in making up or disconnecting trains, the Tomlinson car, electric and air coupler was adopted. Standard safety features operative also on two-car trains have been installed. All doors are operated by air engines. Light-weight General Electric type M controls were installed, our experience being that the expense of maintaining this type control is less than the expense of maintaining two platform controllers of the same capacity.

Experience having proved the popularity of the low-floor car with its advantages of fast and safe loading and unloading, the company adopted this type of construction, the floor extending on a line between crown pieces with slight ramps from bolsters to platform.

A smoking compartment, accommodating sixteen seated passengers, has added much to the popularity of these cars. Another important feature is the exceptionally good lighting.

Signals for starting are given by lights in front of the motorman. The stopping signal is a single-stroke electric bell, operated from push-button stations at the conductors' positions on both cars of the train. The doors either in the single car or two-car train must be closed before the motorman can get the signal to start, and as an added precaution the cars are equipped with motorman's mirrors. After the doors have been closed and the brakes released it is impossible for the conductor on either car to again open the doors unless the brakes are applied. This has served to prevent the type of accident wherein the conductor closes the doors and the motorman gets the signal to start, then seeing a passenger approaching, the conductor changes his mind, opens the door again just about the time the motorman starts the train. With this protection, the conductor may change his mind, but he cannot open the door until the brakes have been applied.

The Key System Transit Company now has 95 cars of this type, all built by the American Car Company. In November, 1923, the first order was placed for 55 of these cars. The 40 others were ordered in the early part of the present year and the shipment has just been completed.

LIGHTE
double

On the Kentucky Traction & Terminal Company's system the cost of track maintenance has been reduced 34.7 per cent by the operation of light-weight cars—Tie spacing has been increased from 24 in. to 36 in.

In Lexington, Ky., the operation of cars weighing only 17,000 lb. has nearly doubled the life of the track structure

By **F. W. BACON**
Vice-President
International Utilities Company

RESULTS accomplished by the Kentucky Traction & Terminal Company, Lexington, Ky., show clearly that the operation of light-weight cars has an important bearing on the life of the track structure as well as on the cost of its maintenance. Comparing the operating expenses since modern equipment has been in service with the figures for the period when old, heavy cars were used, a decided saving is seen in the cost of track maintenance per car-mile and also in the total cost.

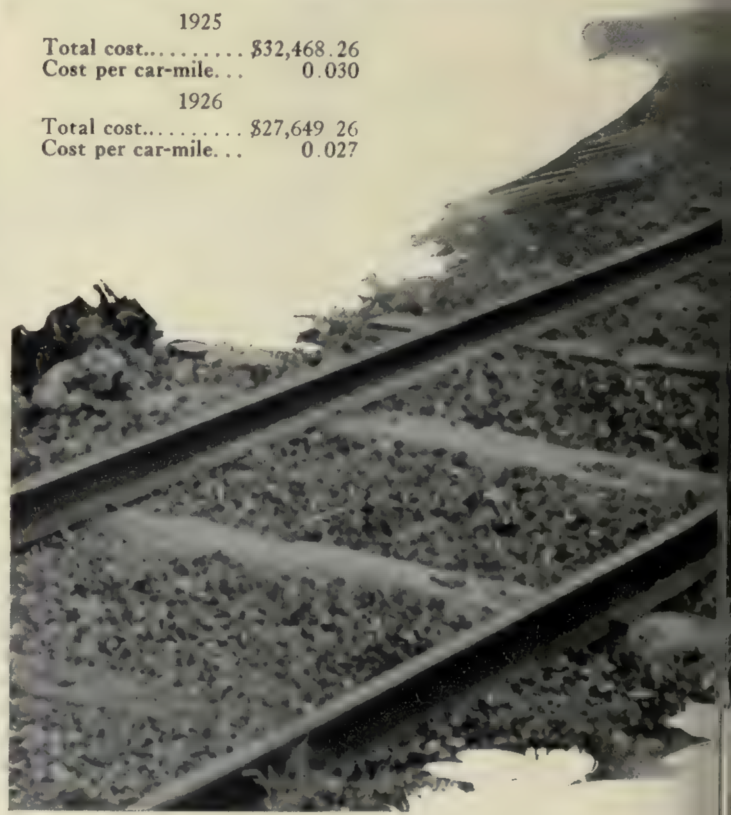
In the spring of 1922 this property, which is owned by the International Utilities Corporation, was re-equipped with 12½-ton interurban passenger cars as well as new freight cars, and the use of the old equipment, which weighed approximately 30 to 38 tons, was entirely abandoned. Similarly, in 1923 in the city of Lexington we replaced the entire lot of 27 13-ton single-truck city cars with a new type of 8-ton single-truck city car, designed to reduce the tonnage, increase speed and to provide a vehicle offering maximum comfort. On this property, therefore, we have comparative operating results for the calendar years 1924 and 1925, as against the year 1921 with the heavy equipment and the two-year period when the change-over was being carried out.

This railway has approximately 71 miles of interurban open track, laid parallel to main highways, and 20 miles of city track, 16 miles of which is in the city of Lexington. The interurban tracks have mostly 70-lb. rail, there being only 27 miles of 80-lb. rail. This track was built about 1906. In the city of Lexington the track, generally speaking, has 80-lb. rail, nearly all paved, and of the 16 miles approximately 12 miles was rebuilt with new 80-lb. rail between the years 1911 and 1917, ballasted on stone and all of which has been paved with asphalt or brick.

Operating results on this property are set forth in the table on page 514, which covers the calendar years of 1921 to 1925, inclusive.

From this statement it will be noted that the total cost of track maintenance per car-mile has dropped from 4.9 to 3.2 cents, or 34.7 per cent, though the operating ratio in cost percentage of gross revenues has remained almost stationary. It will be further noted that the cost of maintenance of track per mile has remained about stationary during the period with the exception of 1925, which is substantially less than the previous years. In general, these operating costs will continue, in my judgment, to show a slight trend downward. For the first six months of 1926 as against 1925 the following total results:

1925	
Total cost	$32,468.26
Cost per car-mile	0.030
1926	
Total cost	$27,649 26
Cost per car-mile	0.027



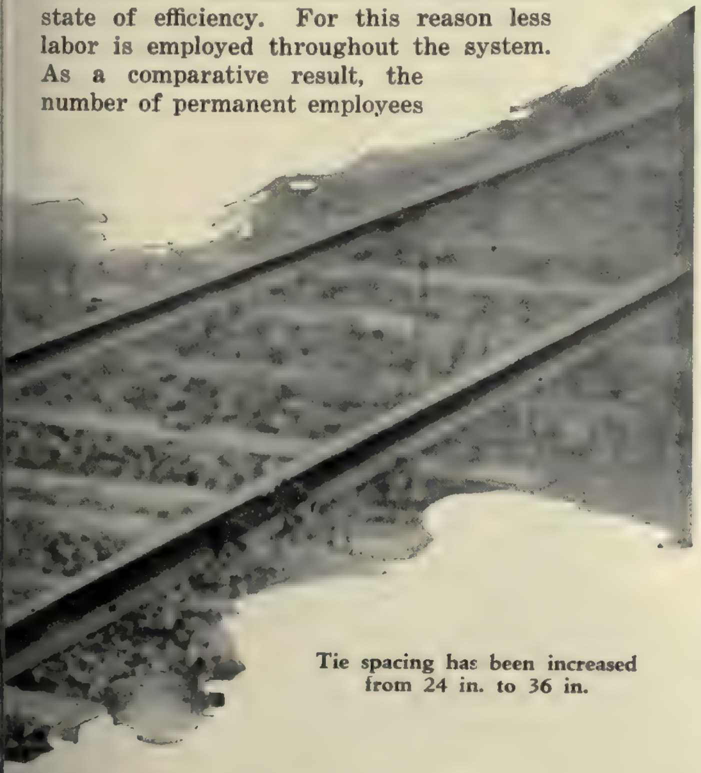
QUIPMENT

e of track

The cause of these reductions in track maintenance costs is primarily the use of the light-weight equipment.

Irrespective of the slight tendency upward during the past several years in the cost of labor, our total labor cost, which is the largest independent item, shows substantially 12.3 per cent decrease over the five-year period. This large reduction in labor cost has been brought about by the fact that the tie installations have been materially reduced and that there is actually less general track tamping and alignment work over the system due to the lighter equipment. Most striking in this respect are the curves, where the light-weight equipment does not cause the same thrust as the heavy equipment.

Reduction of the tonnage load on the rail carries with it almost a corresponding reduction in the physical effort to maintain the rail in the same state of efficiency. For this reason less labor is employed throughout the system. As a comparative result, the number of permanent employees maintained on this road and trackmen during the summer and winter periods is as follows:



Tie spacing has been increased from 24 in. to 36 in.

	Summer Track Organization	Winter Track Organization
1921	59	24
1922	95	43
1923	60	21
1924	45	14
1925	40	16

Ties comprise the second largest item of expenditure. Due to the adoption of the light-weight car, tie spacings have been increased from 24 in. to 36 in. The total tie replacements and requirements have been reduced from a working average for the seven-year period prior to 1922 of 20,131 per annum to an average in the last three-year period of 10,042. It is estimated that 10,000 to 11,000 ties are now the normal requirements of the property. It will be noted in this statement that in the five-year period the tie costs have been reduced 50 per cent, even while it is seen that the cost per tie has advanced from 90 cents to $1.30, or a total of 44½ per cent. Had it not been for the use of the light-weight car this company would have been replacing at least its former average normal tie requirement of 20,000 ties, which at today's cost would have increased this tie item alone by $13,000, to say nothing of the additional items of cost which are connected with the installation of the tie, including spikes, labor, ballast, etc.

Maintenance costs on track rebuilt in 1917 have been much reduced due to the use of light-weight equipment

These figures compared with 1921, based on today's prices and the amount of ties actually installed, represent a difference to the credit of the light-weight car of $24,144. It must be borne in mind that with the reduction of 880 in the number of ties used per mile of track, or 33⅓ per cent, we have a corresponding reduction in all related material.

The use of ties on this property for the past ten years and their cost are shown in the following table:

Year	Number of Ties	Price	Cost
1916	23,078	0.43	$9,923
1917	20,003	0.48	9,602
1918	12,835	0.50	6,417
1919	21,205	0.88	18,660
1920	12,627	0.95	11,996
1921	28,466	0.90	25,619
1922	20,562	1.18	24,264
1923	6,973	1.18	8,228
1924	13,261	1.24	16,443
1925	9,893	1.30	12,861

While it might be argued that the longer tie spacing will increase other rail and joint maintenance items, as a matter of fact the opposite has been the case.

Five-Year Comparison of Track Maintenance Costs

	1921	1922*	1923**	1924	1925
Superintendence	$5,264.92	$4,918.67	$6,377.90	$7,136.80	$5,851.56
Ballast	1,094.32	849.21	1,434.32	1,558.10	173.92
Ties	25,619.88	24,264.11	8,288.90	16,443.65	12,861.64
Rails and rail fastenings	2,279.28	2,617.19	3,148.60	691.54	819.91
Special work	2,250.24	5,853.64	443.61	3,556.34	1,056.54
Track and roadway labor	27,066.89	25,005.85	27,857.16	26,528.41	23,742.38
Paving	5,703.11	4,851.01	10,286.72	10,093.71	9,457.13
Miscellaneous expenses, including sanding, removing snow, etc.	6,620.52	8,159.82	6,305.63	7,605.46	6,943.34
Bridges, trestles, culverts, crossings, etc.	2,581.79	2,959.87	7,436.54	8,760.47	3,928.80
Total	$78,480.95	$79,479.36	$71,519.38	$82,364.48	$64,835.22
Per cent of gross revenue	11.9	14.3	11.9	13.6	11.1
Car-miles operated	1,619,090	1,750,197	1,922,051	1,930,137	2,025,674
Maintenance cost per car-mile operated	$0.049	$0.045	$0.037	$0.042	$0.032
Number of miles of track	93.79	91.33	83.69	89.35	89.35
Total cost per mile of track maintained	$836.77	$870.24	$854.57	$921.81	$725.63
Total car and passenger ton-miles	38,178,884	33,142,318	25,824,807	20,766,743	21,318,600
Cost of labor based on present rate	$27,066.89	$25,005.85	$27,857.16	$26,528.41	$23,742.38
Number of ties used	28,466	20,562	6,973	13,261	9,893
Cost per tie	$0.90	$1.18	$1.18	$1.24	$1.30
Cost of ties based on present market value $1.30	$37,005.80	$26,730.60	$9,064.90	$17,239.30	$12,861.64

*First year light-weight interurban equipment. **First year light-weight city equipment.

In the table it is shown that the item of rail and rail fastenings has been reduced over the five-year period by 64 per cent, and similarly the special work costs have been practically cut in two. Both of these items may be attributed directly to a reduction in the hammer blow effect upon the rail and joint.

The third largest item of expense in the maintenance of our roadway is paving. This item has about doubled in the last five-year period, due to the increased age of the pavement and the uses to which it is put. This, of course, is beyond the control of the company. The use of the light-weight car, with less vibration and track movement, however, has the direct effect of greatly diminishing paving damages adjacent to rail. This item varies so under different conditions that it would be impossible to formulate any concrete idea as to its cost.

From my experience it would be assuming a good deal to attempt to estimate the proper depreciation in track structure, or, putting it in the other form, to estimate with any great degree of accuracy the increased life that will be got out of the general track structures by the adoption of the light-weight equipment. It has been proved conclusively that large savings can be made in current track maintenance.

The effect of the use of the light-weight equipment on the general structure is very apparent to those who have followed the subject closely, and it is our belief that the life of this structure will, generally speaking, increase in its usefulness in about the same ratio as you decrease the tonnage load applied to the structure.

In the Kentucky properties during the five-year period we have reduced the ton-miles operated per annum by substantially 17,000,000, or 44 per cent, although we have increased our car-miles operated by approximately 25 per cent. If, therefore, it is sound to assume that the life of the track structure will vary in inverse ratio to the ton-miles passing over it, this reduction to 56 per cent of the ton-miles should make the life under the new conditions 100/56 or 178 per cent. In other words, we have added 78 per cent to the total life of our track and roadway structures. From this it is apparent that the reduction in ordinary maintenance is real and is a direct cash return attributed to the use of the light-weight car. Furthermore, by the reduction in ton-miles operated the life of existing track structures will be substantially increased. This is probably the largest factor to be taken into consideration and due credit must be given to it when considering investment in new light-weight equipment.

Less trouble has been experienced with rail joints and paving since modern cars have been in service

IMPROVEMENT

continued in Pittsburgh with modern equipment and methods

By T. FITZGERALD
Vice-President
Pittsburgh Railways

Better equipment has made service more attractive and increased riding, while resultant improvements in maintenance methods have effected substantial reductions in operating expenses

Modern cars furnish high-class transportation service in Pittsburgh's busy streets

DURING the first six months of 1926 the Pittsburgh Railways carried 38,000,000 more passengers than during the corresponding period of 1923. Due to numerous recent fare reductions, however, the gross revenue was less despite the larger traffic. The decrease in earnings has been more than offset by economies effected in both the maintenance and operating departments, so that the net revenue shows a substantial gain. Contributing elements to this result have been many. First, new cars of modern design have made it possible to furnish a service that has pleased the public. Second, development of the way department, made possible by the purchase of new tools, together with the adoption of modern methods, has produced large savings as well as improvements in the quality of maintenance. Third, a similar development in the equipment department, following the purchase of new rolling stock, has resulted in a considerable saving.

Industrial conditions in the Pittsburgh district have been rather unsatisfactory during recent years. In particular the coal industry has been seriously affected, the estimated decrease in earnings being about $100,000,000 a year. Railway revenues, however, have not followed the downward trend of business conditions nor the upward trend of traffic. More than 100 concessions have been made in the use of transfers. Five-cent fares have been established on short-haul routes and Sunday and weekly passes have been put into effect. All this has stimulated riding tremendously, but the actual return to the company has been $286,000 less than during the first half of 1923. Comparative figures of revenues and expenses for the past three years are given in Table I.

Table I—Revenue, Expenses and Earnings, 1923-1925

	1923	1924	1925
Gross railway revenue...	$22,547,745	$22,063,777	$21,813,696
Total operating expenses	17,622,092	17,360,901	16,847,034
Taxes.................	801,627	668,018	614,143
Total operating expenses and taxes...........	18,423,719	18,028,919	17,461,177
Net earnings after taxes	$4,124,026	$4,034,858	$4,352,520

Included in operating expenses for 1924 and 1925 are portions of debts which were assumed when the receivers were discharged and which are being amortized over a period of years. The year 1924 carried $402,903 and 1925 $441,537 of such expense. The expenses of the traction conference board, also carried in operating expenses, was $41,250 for the year 1924 and $37,500 for 1925.

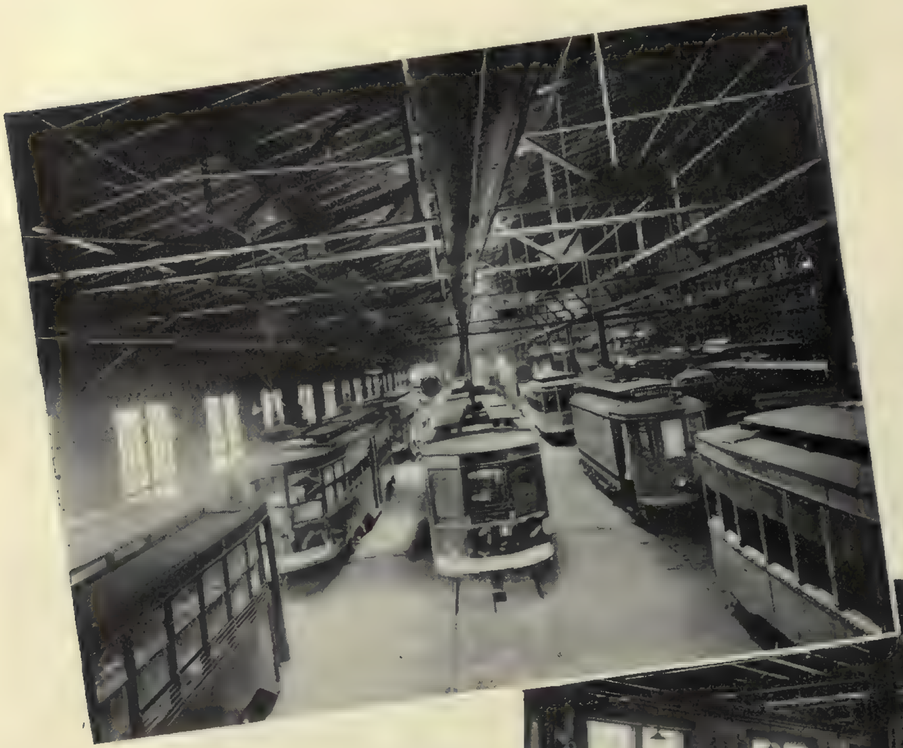
After the Pittsburgh Railways emerged from receivership attention was directed first to making savings in the maintenance of way and structures department. This was done through purchase and use of new and modern equipment and facilities, the consequent concentration of gangs, better distribution of material, and improved methods. In two years time a reduction of

Three paint lines used in Homewood shops, Pittsburgh Railways

The line drawing below illustrates the layout of the paint shop, requiring 24 painters and workmen, producing twelve to fifteen repainted cars per week. During the night the painting line on each of the three tracks is stepped up one position. The finished cars are removed by the transfer table at the top of the diagram and the new cars to be painted are placed in the first position at the bottom of the line.

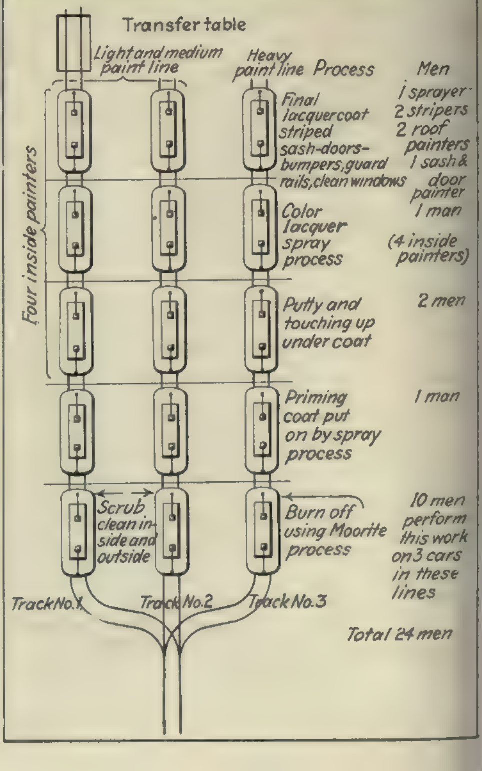
Lines Nos. 1 and 2 are used for light and medium paint jobs and line No. 3 for complete repainting. The cars in line No. 3 stay in each position two days.

The bogey set for this paint shop is fifteen cars a week. The company has standardized on the lacquer system for all steel cars.



Upper view—Car painting is done on the line production basis. The three lines of cars advance one position every night. The same men thus perform the same work on different cars each day

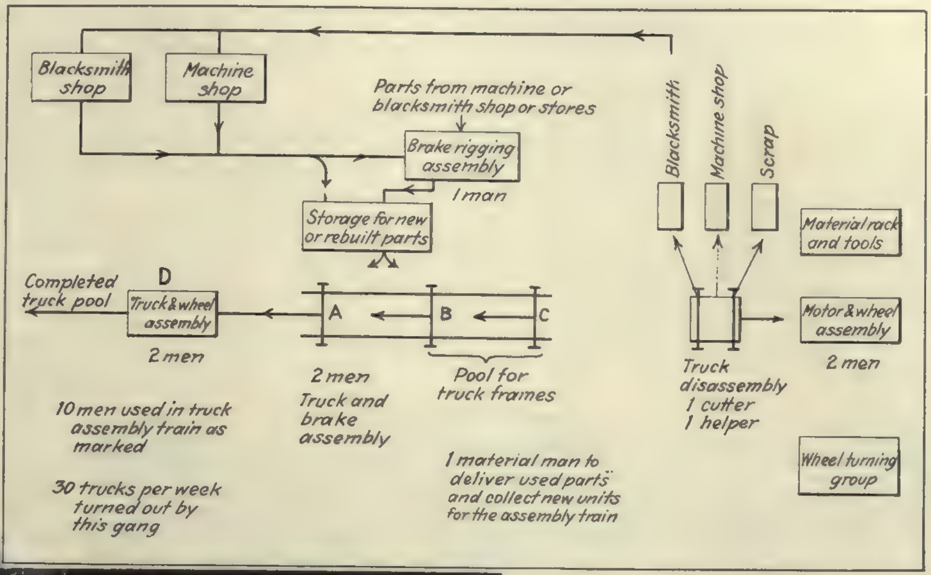
Lower view—Armatures are wound on the line production basis, by the creation of a pool of cores ready for winding and another pool of completed armatures ready for installation in motors


Transfer table
Light and medium paint line
Heavy paint line
Process
Men
Four inside painters
Final lacquer coat striped sash-doors-bumpers, guard rails, clean windows
1 sprayer 2 stripers 2 roof painters 1 sash & door painter
Color lacquer spray process
1 man (4 inside painters)
Putty and touching up under coat
2 men
Priming coat put on by spray process
1 man
Scrub clean inside and outside
Burn off using Moorite process
10 men perform this work on 3 cars in these lines
Track No. 1
Track No. 2
Track No. 3
Total 24 men

After the trucks are disassembled the wheel assemblies are set to one side for further dismantling. The wheels are turned and replaced, motors are taken apart and armatures sent to winding room, if repairs are necessary, and then all parts are brought back and reassembled in the units shown in this view

Standard trucks rebuilt on the line production basis

This diagrammatic sketch shows the relative positions used in the disassembly and the reassembly of trucks. One laborer attends to handling all material on this line. Men who cut down the trucks put the materials in separate containers—one for scrap, one to go to the machine shop and the third to the blacksmith shop. This laborer also brings the repaired material back to the assembly line, stacking the repaired units at the point "B" on the truck assembly rack. No men are working at positions "B" or "C," as these positions are for collecting parts ready for assembly. When the truck assembly is moved from position "A" to the jig immediately to the left, "D," this laborer moves "B" and "C" forward. On the truck in the "B" position the exact amount of material, consisting of bolts, nuts, washers, cotter pins, etc., is assembled and placed on a steel plate so that the men who are working on the truck at position "A" do not have to move away for materials. The trucks are assembled upside down.



The skeleton truck frames, shown at left, are placed upside down at this assembly position. As can be observed, the frames can be rolled forward on the rails forming the support for the truck frame. In the foreground the frame is ready to have the brake rigging mounted and on a steel plate can be seen the necessary tools and the exact number of bolts, washers, cotter pins, etc., required in the work. When the frame to the left is completed it is lifted by crane to the jig used to assemble the wheel and motor units and the truck frame in the foreground is rolled forward

The view at the right shows the brake rigging assembly position. New or repaired parts are brought to this bench and one man assembles the brake rigging on a jig

Table II—Development of Maintenance Departments Reflects Savings in Expense Without Curtailment of Work

Detail of operating expense:	1923	1924	1925
Way and structures	$3,788,843	$2,685,011	$2,492,697
Maintenance of equipment	2,497,494	2,513,962	2,235,267
Power	2,136,006	2,034,877	2,005,651
Conducting transportation	7,162,007	7,440,744	7,263,546
Traffic	59,675	160,226	204,490
General and miscellaneous	1,978,066	2,526,082	2,645,384

Conducting transportation expense has increased despite the increase in one-man operation, totaling 135 cars at present, due largely to increase in wage rate effective May 1, 1923 Present wages are 63 cents minimum to 67 cents maximum, with 5 cents per hour additional for one-man car operators. General and miscellaneous expenses are higher largely due to amortization of certain pre-receivership expenses, as previously outlined.

This illustrates the jig used to mount the wheel and motor units in place. An air cylinder depresses the bolster and springs, making possible the mounting of wheels and motors without the tedious depressing of springs by means of the screw process very generally used. The wheels are laid on the racks shown at the ends

53.3 per cent was made in the number of men employed in maintenance work of this department, with consequent reduction of 50.5 per cent in the payroll.

During the latter part of 1925, and continuing up to this date, drastic changes in equipment maintenance methods have taken place. Even yet the work is far from completion and, hence, present results are only partial. Nevertheless, during the year 1925 a reduction of about 23 per cent was made in the number of men employed, with a consequent reduction in this payroll of more than 18 per cent.

First the overhauling work previously carried on in six of the company's shops has been concentrated at Homewood, which is the largest and most centrally located of six shops. At the present time about 90 per cent of the shop work is done there and the remaining 10 per cent at Manchester. The principle of the "line assembly" as used in automobile manufacture was applied to this overhauling work. In the Homewood shops this system has been applied also to the painting of cars, the winding of all armatures and the rebuilding of the "M-25" trucks, which are now practically standard on the property.

Cars to be painted enter the paint shop at one end and are placed in the "first position" on one of the three tracks used for this purpose and move progressively from one position to the other. The completed cars are taken off the other end of the tracks on a transfer table completely finished. Two of the tracks are used for the repainting of cars that do not require that the old paint be removed. The third track is used for cars which are scheduled for stripping to the metal, requiring a complete repainting job.

The first position on the two repaint tracks is devoted to cleaning the cars. A gang of ten men can thoroughly clean the outside and inside of the two cars in one day while in this position. At night the two lines of cars for light painting are advanced one position, or a car length. The heavy paint line advances every two days. Here another gang applies the priming coats by the spray process. The third day puttying and touching up the under coat is accomplished and cars are prepared for the finishing coats, applied the fourth day. At night these cars are again moved forward to the fifth position, where the final lacquer coat is applied and roofs, fenders and window guards are finished. In all, five days are required and the cars are ready for service, each phase of the work being done by men experienced in this one element of the work and with equipment and material always in place.

On the third track, where cars are completely repainted, slightly longer time is required, the car remaining in the same position for two days in certain steps.

In all 24 men are used continuously in these three lines of the painting process, and at present about

Table III—Car Change Record, Highland Carhouse, 1926

Month	Total Car Changes	Permissible Car Changes (Based on 6,000 Miles per Change)	Per Cent Performance
January	50	33	66
February	55	38	68
March	52	34	65
April	35	34	99
May	22	36	163
June	18	34	188
Total	..	...	..
Average	..	..	..

Table IV—Car Change Record, Ingram Carhouse, 1926

Month	Total Car Changes	Permissible Car Changes (Based on 6,000 Miles per Change)	Per Cent Performance
January	60	28	46
February	80	26	32
March	40	29	72
April	24	28	116
May	22	28	127
June	16	28	175
Total	..	...	...
Average	.	..	...

Car change or "pull-in" records are kept for each carhouse. Here are two records for Highland and Ingram. Improvement is observed in the per cent performance record for this year as a result of the better inspection methods developed.

eleven completed cars are being turned out per week. With further experience with this system, it is expected that on an average of fifteen cars can be turned out every week by the same number of men. This has been accomplished certain weeks. The lacquer system is used entirely in this process, both the priming coats and the final coats being sprayed on. The cars to be completely repainted are first cleaned by the Moorite paint-removing process.

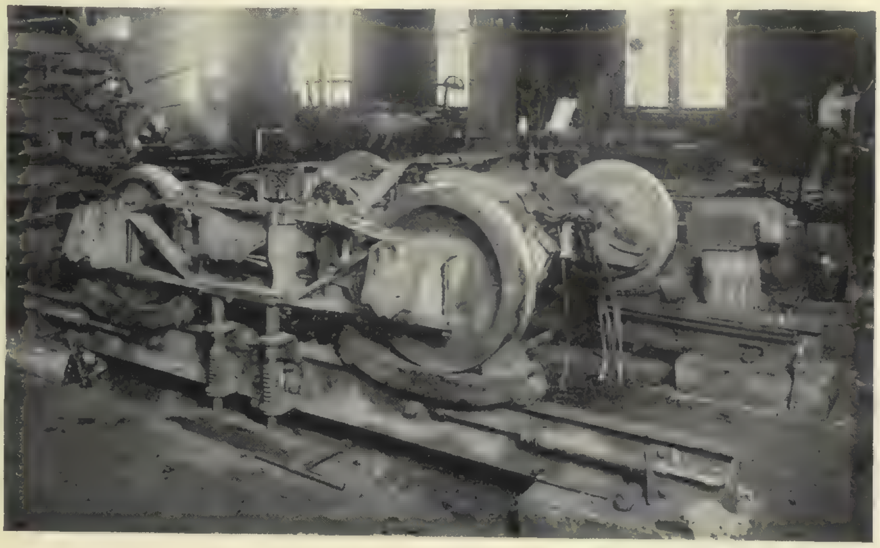
The same general plan has been applied to the rebuilding of the M-25 trucks. In the first place, whenever any trouble develops on the motors, leads or trucks, except slack brakes, the crippled car is sent to the Homewood shops. There the car body is lifted by means of an electric hoist and the disabled truck removed on a transfer table. From there a crane immediately removes it to the pool of damaged trucks. A rebuilt truck from a pool at the other end of the line is immediately placed under the car. This complete change of a truck requires about fifteen minutes. The car is then ready for service again.

For the successful operation of this kind of system it is essential to have a pool of trucks requiring repair and another of trucks that are completely rebuilt, as well as a supply of rebuilt parts always ready for use. The truck to be rebuilt is placed in the first position, where a "gang" of one man and a helper burn off all the necessary bolts and rivets (marked by the inspector). The truck is then broken down. Component parts are next set in line just to one side of this position. These parts are sent to the blacksmith or machine shop and after repair are again immediately placed in pools alongside the truck line. The rebuilt truck frames are then assembled in another position, as shown in the accompanying diagram. Brake rigging is assembled, motors and axles put together, and finally the entire truck is reassembled by other gangs working adjacent to these positions. In the final position the truck is placed on a jig and an air cylinder is used to depress the bolster, which allows the wheel assembly to be set in place, thus completing the process. The completed truck is then carried by crane to the rebuilt truck pool.

One man is engaged with the supplying of the necessary bolts, rivets and washers, etc., to the truck assembly position. The exact number needed is laid on a steel plate convenient to each operation, so that none of the gang has to make trips to and from the storeroom. The necessary stores supplies are requisitioned ahead of time and are delivered from the storeroom in small motor lorries that make regular trips to all of the points of distribution in the shops. These motor lorries also deliver broken down parts to the repair units and redeliver the repaired parts to the assembly line.

Damaged armatures first go to the stripping unit, where one gang completely removes the winding and prepares the cores for new coils. After core and commutator repairs, the armatures are placed on the winding racks and other operators place the coils and core insulation. The armatures are then moved to another position, where the armature leads are soldered into the commutators. In the next position the coils are banded by the man who is engaged in this one process all of the time. Then, if necessary, the cores are dipped and baked, when they pass to the commutator turning and undercutting positions, after which they are tested, painted and moved by lorry to the motor assembly floor.

Car washing methods have been improved by installing spray racks and electrically driven scrubbing brushes at several of the carhouses. As this system is developed it will be extended to other stations. A specially designed window cleaner has been developed that allows the windows to be cleaned without removing the window guards. This operation was told in detail in ELECTRIC RAILWAY JOURNAL, page 262, Aug. 14, 1926.



After the wheel and motor assemblies are placed in the racks and the bolster depressed, small air cylinders, seen in this view, slide the wheels into place, after which they are bolted to the trucks and the job is complete, being carried by crane to the rebuilt truck pool

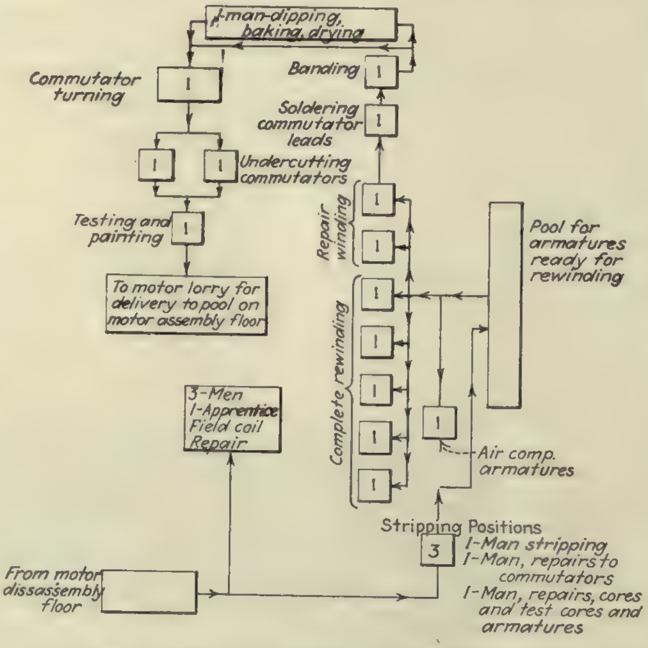
Cars are housed in twenty different locations in the Pittsburgh district. Inspection work is being developed on the basis of unit inspections of all equipment in a

Table V—Comparative Car Change Report

Carhouse	Position Standing Each Month					
	Jan.	Feb.	March	April	May	June
Highland	3	3	6	4	2	1
Ingram	4	5	5	2	3	2
Emsworth	1	1	1	5	5	3
Craft Ave.	14	17	14	11	14	4
Manchester	5	4	8	3	6	5
Charleroi	2	2	3	1	4	6
West Park	15	8	9	8	1	7
Tunnel	9	11	10	12	11	8
Carrick	8	13	7	9	9	9
30th St.	7	6	13	13	8	10
C. Shannon	6	7	2	6	13	11
Keating	11	12	12	7	10	12
Millvale	10	9	11	10	7	13
Homewood	18	15	15	16	12	14
Glenwood	17	14	16	17	17	15
McKeesport	20	20	20	20	20	16
Rankin	19	19	18	19	19	17
Washington	12	16	4	4	14	18
Plummer St.	18	18	17	18	16	19
Herron Hill	13	10	19	15	18	20

Every month a "position standing record" is prepared listing the carhouse having the best performance for the past month first and the rest in the order of their results. These sheets are sent to each carhouse foreman.

manner similar to the work of overhauling of cars in the Homewood shops.


1-man-dipping, baking, drying
Commutator turning
1
Banding
1
Soldering commutator leads
1
1
1
Undercutting commutators
Testing and painting
1
To motor lorry for delivery to pool on motor assembly floor
Repair winding
1
1
Pool for armatures ready for rewinding
Complete rewinding
1
1
1
1
1
1
Air comp. armatures
3-Men
1-Apprentice
Field coil
Repair
Stripping Positions
3
1-Man stripping
1-Man, repairs to commutators
1-Man, repairs, cores and test cores and armatures
From motor dissassembly floor

Armature winding systematized in Pittsburgh shops

Diagrammatic plan of handling armatures in the "line" process shows the direction of movement and the number of men employed in each position, there being 22 in all. The success of this operation depends upon having not only a pool of armatures ready for winding but a steady flow of all materials used. Materials are requisitioned ahead of time and placed in proper locations so that the workmen do not have to move away from their positions or go to the storeroom for any materials.

The cars to be inspected in each carhouse are lined up and specialized gangs do their work in logical order — one gang inspects trucks and tightens brake-rigging, another inspects car body, seats, steps, doors and such details, another inspects controller and electrical connections, etc.

For the purpose of building up a comparative record a complete follow-up system is being established and each month the position of each carhouse is determined on the basis of the mileage obtained for each pull-in necessitated by a crippled car.

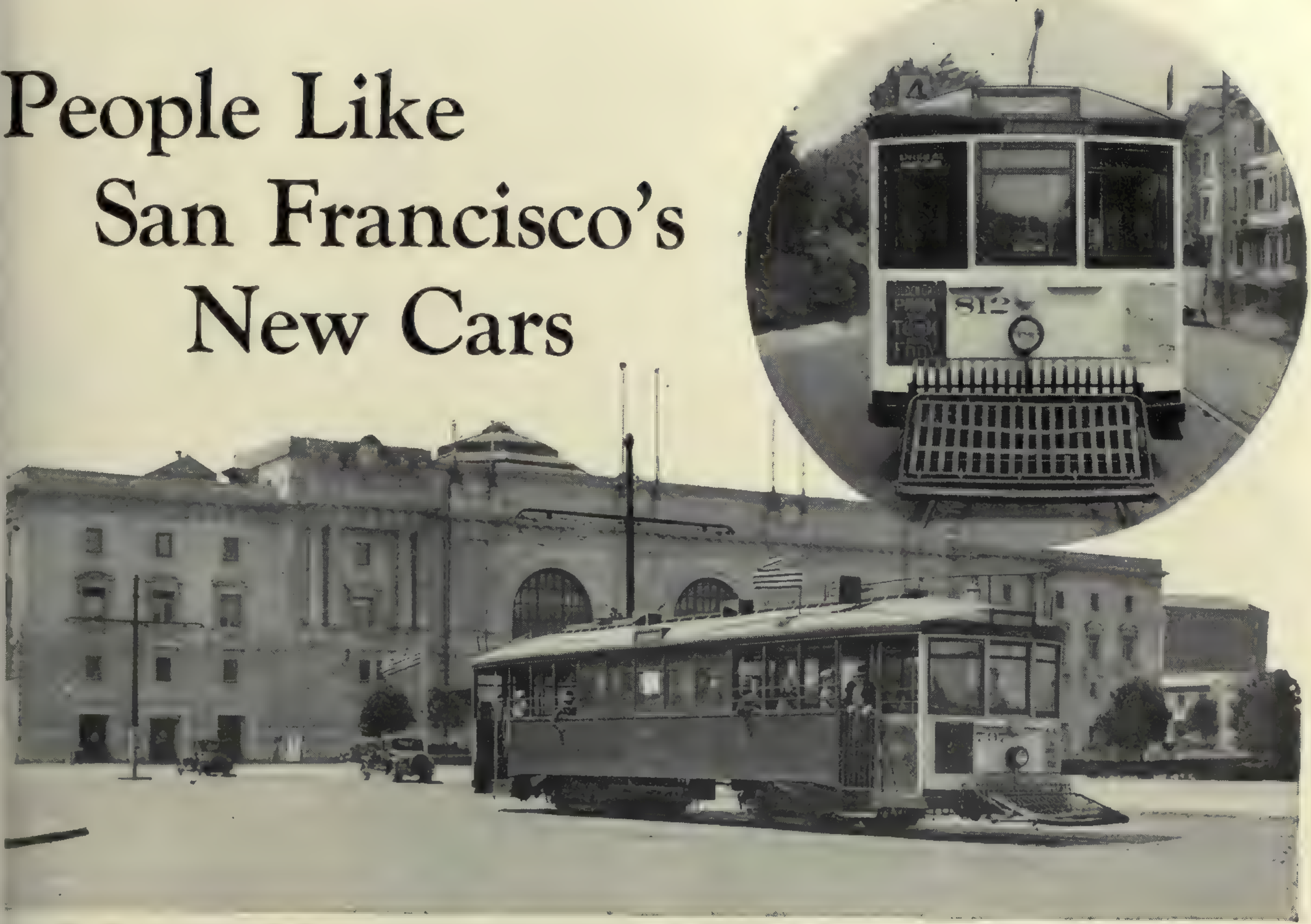
In order to follow up the work at each carhouse a position standing sheet is made up each month and sent to all the foremen at the various carhouses which shows their records for several past months and listing the order of their standing for the current month.

In addition to this, a small set of sheets is prepared, similar to the sample reproduced herewith, showing the total car changes and the permissible number based on a bogey of 6,000 miles per car change; the third column shows the percentage performance, which is the ratio of the second column divided by the first. The work has progressed so far in the Highland carhouse that nearly double the permissible mileage originally set as a bogey is now obtained. All of the carhouses show improvement.

In addition of these records, other more detailed records are obtained and kept for reference showing the exact cause of each car failure. These records are invaluable as they throw a searchlight on the weak points. Several of these details are now under investigation and plans are being developed to change the construction of the device causing the trouble. In this way it is expected that the condition of the cars will not only be maintained but greatly improved as time goes on.

Typical scene at Fifth Avenue and Wood Street, Pittsburgh, during the rush hour

People Like San Francisco's New Cars



Open-end sections on the new cars of the Market Street Railway of San Francisco have proved popular with the riding public

In circle—The ends of the new car are painted white and brightly illuminated at night, thus greatly increasing its visibility

By M. McCANTS

General Manager Market Street Railway
San Francisco, Cal.

Market Street Railway has developed a standard type of vehicle combining moderate first cost and low operating expense—Open-end sections are liked by passengers

PRIOR to 1920 the Market Street Railway of San Francisco, like many others, had experimented with a number of different types of cars. We had long cars and short cars, high cars and low cars, cars with seats lengthwise and cars with seats crosswise. The electrical equipment showed nearly the same variation. About that time, however, we instituted a new training system for platform employees. So difficult were the problems of breaking in new men with such a variety of cars and equipment that we decided to try to design a standard car that would suit our own local conditions. Requirements which the new car was expected to meet were lightness with strength, attractiveness with economy, simplicity with safety, and large capacity with adequate speed.

San Francisco, "sitting on its seven hills," probably has more and steeper grades than any other city in the United States. For this reason in designing a car allowance must be made for steps, fenders and trucks at the dips in the street level and for plenty of motor power on the heavy inclines. Also, in San Francisco the people are great lovers of fresh air and sunshine, so that plenty of open space must be provided. At the same time it must be possible to protect passengers in wet weather, for there are occasional rains even in sunny California. The building of a car that would meet these specifications seemed impossible at first, but, thanks to the skill of our superintendent of equipment, it has been done. To meet the demand for fresh air each end of the car has an open section with a seating capacity for twelve passengers. There are two cross seats on each side, each seat being 34 in. long, thereby allowing 17 in. per passenger. Longitudinal seats for four persons are also placed at the ends of the open sections, thus leaving a wide space for entrances and exits.

In winter the open sections are protected by storm curtains. The upper ends are ratcheted tightly against the inside upper part of the car frame and the lower ends are buttoned on the outside of the car. When not in use these curtains are rolled tightly and inconspicuously on the inside at the top.

A few of our old cars had one open section, but many of them were entirely closed. Needless to say, our patrons very much prefer the new cars, especially during the ten months of the year when it is more pleasant to be out of doors than to be inside. Another advantage of the two open sections is that passengers may smoke at either end without giving offense to non-smokers who may also want to sit outside.

Platforms are roomy and are reached from the street by one step, which is 15 in. from the ground. This is the minimum possible owing to dips in the street at the ends of steep grades, which sometimes are as much as 13 per cent. From the step to the platform is only 10 in. To give the car the greatest possible capacity without requiring too great width for clearance the steps are all set back into the platform proper and do not project beyond the longitudinal body line.

On each side are five fixed-sash windows extending high enough so that even a standing passenger can see out without stooping. Ventilation is secured by means of a perforated panel over each door, and the roof, which is turtle-backed, has four funnels, two opening forward and two backward, similar in type to ships' ventilators. There are no floor ventilators.

In San Francisco the track centers are 11 ft. ½ in. apart and this permits a wide car body, so that our standard design has a width of 9 ft. 2 in. and is 47 ft. over bumpers. The weight of the car body complete is 17,560 lb. and of the entire car 39,100 lb. The standard capacity of the car is approximately 100, so that during the rush hour 150 passengers can be carried without difficulty.

Light Weight Has Many Advantages

Many advantages have resulted from the light weight, particularly because it is combined with large carrying capacity. Not only does the car require less power on the hills, but it takes less power to start and stop and consequently operation is smoother. Passengers frequently remark about the comfortable riding qualities, but these qualities are merely due to smooth operation. The lighter weight also means less wear and tear on roadbed and reduced expense for maintenance.

M. MC CANTS

The standard car adopted is not only economical to manufacture but economical to maintain. The frame and posts are of yellow pine, which is a local wood, and the sides are of No. 12 steel. The side is assembled in one piece and then bolted to sills and posts with Eagle carriage bolts. The platform fronts also are assembled as units. In case of a damaged front or a damaged side it can be removed easily and repaired in a short time. Bolsters are so constructed that they can be removed in less than an hour. Wiring and auxiliaries also are designed for simplicity and ease of repair.

All frills have been eliminated. There are no fancy panels or headlinings. Platforms, floors and steps are all covered with a material that resembles heavy roofing paper. When its use was first suggested to us we were skeptical. However, we gave it a trial on one of our cars and at the end of two years no appreciable wear could be detected, so it has been adopted as part of our standard equipment.

Roofing paper has numerous advantages over an uncovered wooden floor. It is smooth. No one trips over it, and yet it is impossible to slip on it even when it is wet. Cheap lumber can be used underneath. It is easy to install. It eliminates replacement of worn-out flooring. It is warm on the feet of both the platform men and passengers. It is inexpensive and wears indefinitely.

As a safety precaution a strip of the same material has been placed on each step to minimize the danger of slipping. The low height of the steps has been an important factor in reducing boarding and alighting accidents on this type of car. So, also, has the elimination of overhanging steps, which were a prolific source of accidents on the older cars.

Another improvement which we have recently made is to paint the car fronts white. The sides remain chrome green medium, which is the color that has been used on all of our cars for a number of years. The fronts have been wired so that they are brightly illuminated at night. Two reflectors with two lamps each are placed on each side of the car and one light illuminates each exit step. This not only makes the car more visible at night, but also makes it appear wider. Both ends are kept lighted at night while the car is in service. Because the car can be seen at a considerable distance accidents involving pedestrians and vehicular street traffic have been reduced to a marked extent.

Operating Costs Have Been Substantially Reduced

We now have 190 of these standard cars in service, all built in our own shops. We figure that the adoption of this new standard type of car has saved us thousands of dollars in operating expenses. The interest on the reduction in original cost is itself probably sufficient to take care of all maintenance charges on the new bodies. Added to that is the great reduction in the number and cost of parts we now have to carry and the savings already mentioned due to lighter weight, etc. Thus it will be seen that it is to our advantage to change over to the new type as rapidly as possible. Our shops are at the present time turning out a completed car every two weeks and as fast as a new car is ready an old one is scrapped.

We realize, of course, that this design is not the last word in car construction. There are several features which are now being studied with a view to further improvements, and we regard this design as but one of a series of steps which will ultimately combine all of the desirable features we wish to have incorporated in the design.

Better public relations, increased traffic and reduced expenses have resulted from operation of cars of this type in Schenectady

PUBLIC APPROVAL

gained by improvements at Schenectady

By E. M. WALKER
President Schenectady Railway

FROM the very beginning of the business of transportation on land, and this business in one form or another is doubtless as old as the race itself, the trend in vehicle types has been gradually and definitely toward ease, comfort, convenience and safety for the passenger. Great progress has been made; as great, in fact, as that of the human race in its cultural development. Vehicle styles and types have been continually and progressively changed. Innovations during the last century have been frequent as well as radical, and especially so since the advent of the street railway. These changes are all the more marked when the comparatively short life of the street railway in relation to the whole transportation industry is borne in mind.

Collateral developments stimulate each other by their competition, in response to the law of natural selection or survival of the fittest. Whether we are in one business or another, we must always heed natural laws, as the violation of each one carries its own penalty.

Since its advent the street car has had to keep pace with the tastes of the people it served. One has but to turn back in his memory, if old enough, or to look at the numerous available series of pictures showing the development of transportation vehicles from 1888 to 1898, 1908, 1918, and so on down to the present. In the past fifteen years, on account of the amazingly rapid development of the automobile, the pace has been much more rapid than during the early days of the electric car. The field of development has been so alluring, on account of rapid growth and high rewards, that a multitude of ingenious minds have been attracted to the work of vehicle design and construction. The contest of minds engaged in producing something more comfortable, more speedy and more sightly than has ever before been produced has been without precedent both as to the time required and the results achieved. Tastes have been quickened and the demands have been much more exacting than in the "horse and buggy age." This, of course, has given a challenge to those operating electric railways as well as to those engaged in building electric cars and transportation appliances.

THE CHALLENGE ACCEPTED

Any one engaged in the electric railway business must be willing to accept this challenge. He must be sincere in his belief in his business, in its necessity and in its utility. He must be a believer in the general principle that any business for which there is a legitimate need, and which performs a necessary service and performs it well, can be operated profitably. In other words, the world always holds out rewards for wise management of useful and necessary public service enterprises.

Realizing the change and development of the public taste in the matter of vehicles for transportation the American Electric Railway Association has in its organization an active committee engaged in this very matter of bringing the industry up to date in the matter of replacing out-of-date equipment with modern, attractive and more efficient rolling stock. That this demand is growing is evident from the statistics of passengers carried and that it will continue to grow is in the very nature of our modern city life.

PUBLIC DEMANDS MODERN EQUIPMENT

People who ride, and in these modern days who does not ride (it has been estimated that there is enough automotive equipment in use in this country today to furnish the entire population with a simultaneous ride), have all of a sudden been educated to the most modern kinds of vehicles. They would, as far as automobiles are concerned, just about as soon walk as ride in one of the old "highboys" of ten or fifteen years ago. What wonder, then, that in the matter of street cars the riding public (the very same people) should be rather exacting and critical in the matter of the kind of cars they ride in and that they should want something modern and up to date as distinguished from the heavy, slow-moving car of other days, with its high steps—and sometimes three or four of them—to climb, narrow doors, small vestibules, and what not. They simply will not be satisfied with such vehicles, and mortification is bound to set in on the property so equipped.

IF THE character of our service has reached a point where people won't ride unless they have to, it is up to us to make the service more desirable. And we can do this by modernization of equipment, by putting on cars that will furnish the best known means of electric railway transportation and by relegating to the scrap pile those that tend to remind the passenger that because they were good enough for his father they ought to be good enough for him.

We have heard much in the past and are hearing much at present about valuation, or cost, being the determining factor in the rate of fare. As a matter of fact the value of any property is determined by the value of its service. The truth of this is as old as the hills and it is only a restatement of the following law: The value of an article depends on who wants it and on how badly he wants it. To realize the truth of this one has only to try to sell a $25,000 house when nobody else wants it. All of this has a bearing on our own business.

If the character of our service has reached a point where people won't ride unless they have to, it is up to us to make the service more desirable. And we can do this by modernization of equipment, by putting on cars that will furnish the best known means of electric railway transportation and by relegating to the scrap pile those that tend to remind the passenger that because they were good enough for his father they ought to be good enough for him.

There are in the industry many properties where this has been done partially or completely. The improvement has always been followed by the desired results, provided there was in the first place a real demand for service and a real reason for the existence of the line.

The case of the Schenectady Railway is not in any way unique. It is rather typical of what can be done, and in fact has been done in many other instances. At the close of 1923, in the latter months of a well-nigh destructive labor disturbance, the management, taking stock of the available tools and appliances, found five distinct types of city cars, and just as many different methods of fare collection, with only 10 per cent of these cars less than six years old, and some of them 25 years old. Clearly many of them had passed their years of usefulness. The patience of the riding public was well-nigh exhausted and there was but little faith in the company's willingness or desire to operate a real railroad and to furnish real service in a city where such service is really needed. Schenectady is perhaps in a class by itself, in that a very high percentage of the people are capable, by the very nature of their occupations, of judging intelligently the elements that go to make up railroad service. Accordingly the company embarked upon a definite plan of modernization of its equipment. Ten modern cars were immediately purchased. Within a year and a half of their installation twelve more of the identical type were added to the company's system.

We were confident that we must modernize if we wished to retain the business we had and recapture some of that which we had lost and, above all, if we were sincere in wishing to give our people good railroad service. We did not make any bargain with the community for so much increased good will per new car, but felt that, once the people were convinced of the sincerity of our announced aims of giving the best possible service, good will, with all of its byproducts, would follow. Complaints of poor service were frequent and were in most cases justifiable. Morale was low, as it always is in the wake of a long strike.

BETTER EMPLOYEE MORALE WITH UP-TO-DATE CARS

It has been interesting and gratifying in the extreme to experience the change in public sentiment toward the company since the advent of the new cars. A sufficient number were purchased to furnish about 50 per cent of the base service and the remainder of the service was furnished by the best and most modern of the existing equipment, all thoroughly overhauled and as far as possible standardized as to equipment. Fare collection was standardized and simplified and a new and quicker transfer system installed.

Along with the favorable development in public feeling toward the company has come an improved employee morale, which together have brought about several desired results, a great reduction in accidents and in car failures and a change in the trend of traffic volume from gradually declining to gradually increasing. There has been no radical, no revolutionary change, but simply a healthy development. This has occurred in the face of a continuing increase in the automobile registration in the county. Schenectady County is so relatively small in area that most of its population is urban or suburban and the greater part of it is served by electric lines. The number of automobiles registered up to Aug. 9 in each year for the past five years follows:

Schenectady County Registration (Population 116,000)

1922	11,581
1923	15,634
1924	19,575
1925	22,369
1926	24,443

Of course, it is not claimed that the mere act of buying new cars has brought about these happy changes, but they have been one of the indispensable factors in producing the change. There has been no change in the rate of fare during the five-year period.

NEW CARS MEET ALL REQUIREMENTS

The type of the new cars is double truck, double end, light weight, safety, each car weighing complete for service about 32,000 lb. From actual experience they have met every requirement and tests have demonstrated that they are a most economical car to operate and by far better suited for all-year-round service than any other type of car operated by the company. Records which these cars have made in actual operation have been most gratifying and convincing. Actual results have shown that with a seating capacity of 44 they have carried in an emergency as many as 140 passengers. Under the P-A-Y-E system of fare collection it has been shown again and again that 44 passengers, the full seating capacity of the car, have entered and paid their fares in 52 seconds, which is rapid, in view of the fact that the fare is 7 cents, and although tokens are sold there is no reduction from the 7-cent rate.

Record of Cars Turned in from Dec. 1, 1925, to May 31, 1926

Car No.	Damaged by Accident	Motor	Electric	Resistance	Air	Brakes	Wheels and Trucks	Registers and Car Body
200	2	2				1	1	
201	5	2			1	1		2
202	1							2
203	3	3	1	1	1	3		
204	4	2				1		
205	2	3						1
206	5	3						
207	2	1	1			2		1
208	1	4		1		1	1	
209	2	3	2	2			1	
210	1	1		1	2			1
211	1		1		2			
212	2				1			
213	2		1				1	
214	1		1					
215	1			1				
216			1	2				
217								
218	1	1						
219	1			3				4
220	2				1			
221	1			1				
Total	40	23	8	12	8	9	4	11

Grand total........................ 115
Accidents........................ 40
Total........................ 75

NOTE: Most resistance trouble due to rough tracks. Most motor trouble due to operating through water during spring thaw. The first ten 200-type cars (200-209) have been in service one year and nine months longer than the second of the 200 type cars (210-221). The armatures were not dipped in the first ones, while in the second they have all been dipped and baked. This accounts for less motor trouble.

Another record was established by these new and modern cars during the very severe snowstorms of last winter. Every line equipped with this type of car was kept open and full service given, which was not possible on the other lines operated by older types of cars. This fact earned a lot of good will and favorable comment.

The car is easy of access, which facilitates the movement of passengers in and out, and the low steps make it much easier for passengers boarding or alighting along unpaved sections of road. Higher schedule speeds have been made possible since the introduction of these cars, and this of itself improves the quality of the service to the passengers.

Naturally, very appreciable economies have resulted from the use of these cars on account of their large carrying capacity and light weight. They are capable of rendering exactly the right kind of service at whatever moment it may be needed. A combination of cross and longitudinal seats permits a spacious opening at the front of the car, making more room for passenger interchange.

MODERNIZATION BRINGS ITS OWN REWARDS

A combination of satisfied riders, operators who are so highly pleased with the cars themselves that runs equipped with the new type of car are the first ones chosen by operators when signing for their runs, and satisfied management on account of these two elements, plus operating economies, would seem to be a fairly convincing combination of proof that modernization of equipment carried along with it its own rewards.

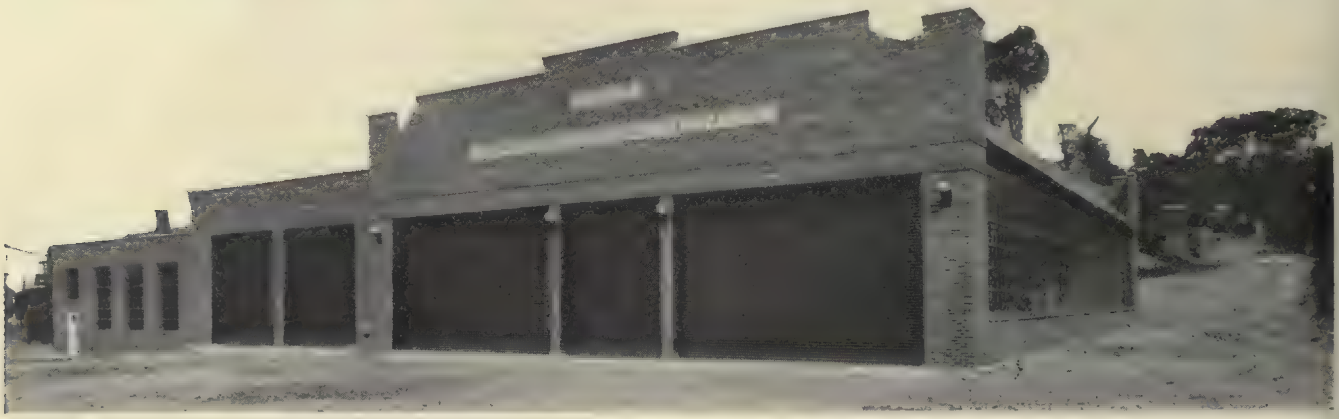
No mention has been made of the effect of a modernization and standardization program on the mechanical department. Since undertaking this program in Schenectady it has been possible gradually to reduce shop and carhouse forces, which were too large to permit of economical operation. The total reduction over a two-year period amounts to nearly 30 per cent. A record of mechanical performance of these cars will no doubt be of interest and is appended hereto with explanatory footnotes.

Taken altogether and from the accumulated experience of those who have tried the remedy, there would seem no doubt that if we are to keep pace with modern trends in transportation and justify our existence by showing our willingness to furnish an up-to-date, reliable, safe, speedy and comfortable form of mass transportation at a low cost that is available to everybody all the time and that can and must be furnished at a profit, we should and in fact must see to it that our equipment is kept reasonably up to the times and fully abreast with all developments.

The new idea in cars is being given attention in Europe as well as in this country. A recent article from London said that the London County Council had recently put in operation along the Thames Embankment a de luxe street car containing seats as comfortable as those in limousines. Special attention was paid to the lighting so as to enable passengers to read their newspapers without straining their eyes. The car has proved so popular that 100 more of the same kind are to be ordered.

NEW EQUIPMENT

puts Youngstown & Suburban on paying basis



Exterior of the recently completed garage for the Youngstown & Suburban Railway

By E. O. SHRYOCK

General Manager Youngstown & Suburban Railway

New equipment and extensive bus operations continue to make greatest gross in company's history—In first year of Fitkin management $125,000 was spent for four new cars, two new buses and a new garage—combined property now earning all charges

REDUCED operating expenses and a distinct upward tendency in revenue have marked the first half-year operation of four new light-weight, one-man cars on the Youngstown & Suburban Railway. While the new cars have hardly been in service long enough to give a real account of themselves, the reduced expense of operation is assured and the increased passenger revenue is encouraging. Except for a few tripper cars all equipment now used is new since 1922.

Co-ordination of the bus and rail service with high-grade equipment has resulted in attracting new business to the interurban rail line, at the same time creating almost as much revenue on the buses. The combined gross today of all operations is greater than in the best previous year in the company's history.

Normally about 40 per cent of the gross revenue of this road is derived from freight haulage and switching. For the first five months of 1926 the curtailment of new building tributory to our line reduced our revenue from freight to the extent of nearly $3,700. Curtailed freight traffic generally marks a local depression which often affects the passenger revenue as well. Despite the freight situation during the early part of this year, however, the passenger revenue for the five months increased from $61,774 to $64,046, or $2,272. Possibly about $1,000 of this was because of an increase of 2 cents in city fares.

ALL CARS ARE NOW ONE-MAN OPERATED

With the advent of the new cars the service to the city limits was increased to give a fifteen-minute headway for fifteen hours a day instead of ten hours a day previously operated. The light-weight features, however, have decreased the operating expense principally in maintenance, power and conducting transportation accounts, so that the total five months expenses have been reduced for all railway operations from $74,750 to $65,808. Increase in net revenue has been effected from $10,151 to $18,828, or more than 85 per cent as compared with the five months period of 1925.

In addition to the railway service over the 20-mile interurban between Youngstown and Leetonia the company operates extensive bus service, paralleling the railway and extending beyond the railway points, covering 93 miles of highway routes in all. This bus service is of an interurban nature, a de luxe type of parlor car bus being used. Except for some service rendered by our subsidiary bus company prior to the time our competitive operations were taken over the service was the same during the first five months of 1925 and 1926. During this period in 1926 the bus revenue was $59,195, as against $53,257 the preceding year, and the net revenue after operating expenses, taxes (except federal) and depreciation increased from $8,931 to $11,879, or 33 per cent.

From these results it is evident that the company as a whole has developed a bus business in its own territory and that adjacent to it nearly equaling the passenger gross of the rail lines.

EXPENDITURES NECESSARY TO ACCOMPLISH RESULTS

With the use of new and modern cars railway operating expenses have been reduced, and we believe the passenger riding on cars will increase, due to the better facilities offered. But it takes money to make money. In September, 1922, the first two light-weight cars were put in service. These two cars were among the first of the light-weight interurban type to be put in opera-

One of the light-weight, one-man cars recently purchased for the Youngstown & Suburban Railway to replace 40-ton, two-man cars. The savings produced turned a deficit into a small profit. Linoleum floors, together with leather-upholstered seats, spaced with ample knee room, make the cars attractive. This has been an important contributing factor in the increase in railway passenger revenue

tion and in a measure helped to blaze the trail for this type of car, at present so extensively used.

Beginning January, 1926, four more cars were placed in operation. The first two cars permitted one-man operation on the short line between Youngstown and Boardman. Heavy cars of the old type, weighing approximately 70,000 lb., performed the interurban service to Leetonia. The new cars enabled us to scrap these and operate the whole system on the same schedule with the modern one-man equipment. Old cars are now used for a few single trips in the morning and evening rush hours.

Table I—Summary of Railway Operations

	First Five Months 1925	First Five Months 1926
Railway gross revenue (passenger and freight)*	$84,901	$84,636
Operating expenses, including taxes (except federal)	74,750	65,808
Net after operating and taxes	$10,151	$18,828
Operating ratio	88.04	77.6
Per car-mile:		
Railway gross revenue, cents	44.93	42.29
Railway operating expense, cents	39.56	32.88
Revenue passengers	514,027	534,605
Car-miles operated:		
Revenue passenger	182,535	192,837
Total, including freight and non-revenue	188,969	200,123
*Passenger revenue alone	$61,774	$64,046

Table II—Summary of Bus Operations

	First Five Months 1925	First Five Months 1926
Gross bus revenue	$53,257	$59,195
Bus operating expense (including taxes and depreciation)	44,266	47,316
Net revenue after taxes and depreciation	$8,991	$11,879
Operating ratio	83.23	79.93
Bus revenue per mile, cents	29.14	31.06
Bus operating expense (including depreciation and taxes)	24.25	24.83
Revenue bus passengers	72,393	79,235
Bus-miles	182,753	190,571

$125,000 SPENT FOR BETTERMENTS THIS YEAR

The budget of expenditures for the past twelve months, embracing the period of the Fitken management, included the four cars mentioned, two new buses and a modern garage and paint shop, totaled $125,000. The paint shop, just completed, will be used for all equipment, both cars and buses, and for that reason it was placed adjacent to the present repair shop and equipped with a track connecting with the yard track system at that point. The garage will not only provide housing facilities for the de luxe coaches but it will provide a well-equipped shop for making inspection and repairs.

With the completion of the new bus garage and paint shop other savings will be possible and the company will be enabled to keep in service more attractive equipment.

The Youngstown & Suburban, along with many other interurbans, lost revenue steadily for many years, and this, in common with mounting costs, put the operating results in red. With the establishment of the bus operations and improvements made in the rail

One of the interurban coaches of the Youngstown & Suburban Railway ready for inspection in the recently completed garage

system the deficits became less, and so far this year the operations about paid fixed charges, despite the serious slump in freight. May, June and July have shown surpluses after paying all charges, which marks a great improvement over conditions existing for five years.

BETTER PUBLIC RELATIONS FOLLOW IN WAKE OF NEW EQUIPMENT

We feel that there is nothing that will promote public good will as quickly as good service. First safety, then courtesy and dispatch are prime elements. If this service can be supplied with new and modern cars, so much the better. A tangible result of our own endeavors to establish good will was the successful effort this spring to secure an ordinance granting an increase in city fare from 5 cents to 7 cents per ride. This will probably continue to show an increase in revenue of about $500 per month.

Table III—Comparison of Passenger Revenues

	First Five Months	
	1925	1926
Railway Passenger Revenue:		
January	$13,785	$13,742
February	11,956	12,104
March	12,683	13,019
April	11,873	12,443
May	11,377	12,728
Total five months	$61,774	$64,046
Increase 1926	2,272—3.7 per cent	

Several years ago this company changed over its power system from 25 to 60 cycles. Three new substation equipments were purchased, two automotive, and one manual station installed in the car shop, where it did not require extra attendance. One of the automotive station equipments is installed in a portable car, and while serving in a chosen locality it can be shifted to act as a spare should either of the other stations fail.

By this change the power situation was much improved. A more reliable source of power supply was obtained at a reduced cost. This change also enabled the company to purchase power at a more central point, thus saving line losses.

About four years ago the open track was completely reballasted, using more than 400 cars of granulated slag. Other improvements recently made in the small amount of paved track on the system have placed it in excellent condition. Movements in and out of the wye at the Youngstown terminal have been facilitated by the installation of an electric track switch.

All of these betterments taken together have placed the property in excellent operating condition.

Eastern Massachusetts Stems the Tide of Competition

Rolling stock used in Lynn, Mass., is typical of that on all divisions

Operating conditions however, differ in this and other communities served

Modern one-man cars, improved maintenance practice and well-cared-for trackage have paved the way for an aggressive merchandising campaign—Net earnings have remained practically constant, although the gross income has decreased—Present efforts are directed toward increasing car riding

MAINTAINING a practically constant level of net earnings in the face of a steadily diminishing gross income during the past six years, the Eastern Massachusetts Street Railway has come truly to merit the appellation "A Street Railway Success," which it has adopted as an operating slogan. They have been years of strenuous efforts, putting every possible economy into practice, in thoroughly modernizing rolling stock, trackage and shops and in generally preparing the ground for an intensive campaign in merchandising transportation which has now been inaugurated. A large amount of unprofitable trackage in sparsely settled communities has been abandoned, bus operation has been substituted in a number of instances and the average fare for the entire system has been reduced from 10 cents to 7.1 cents.

Much credit must be given to the maintenance forces of the company for the excellent record of economy which has been established. Undoubtedly, however, the largest single saving must be attributed to the adoption of modern, one-man cars on all fourteen divisions of the system. The company first began its change-over to one-man operation in 1919, at that time purchasing 250 Birney safety cars, of a somewhat better type than at first developed, which were used to "sell" the idea of one-man operation to the riding public. For five or six years more than 96 per cent of all cars in active use have been equipped and one-man operated.

Prior to 1920, when the new era began to dawn for this railway, things were at loose ends. Matters which should have been under central control had been left to local jurisdiction, and vice versa. All that is changed now, for each of the fourteen divisions is autonomous in so far as is practical, while the general formulation of policies is left in the hands of the general management and of the public trustees appointed by the state. Further to intensify the effectiveness of the local divisions and to stimulate beneficial public relations in the various communities served, divisional "home rule committees" have been formed. These are made up of prominent local citizens who are appointed by municipal authorities and civic bodies to act in an advisory capacity with the local manager.

Table I—Mileage per Pull-in

1920	1,550 car-miles
1921	1,884 car-miles
1922	4,035 car-miles
1923	6,745 car-miles
1924	9,994 car-miles
1925	19,310 car-miles
1926 (first six months)	18,838 car-miles

The effort is constantly made to render as satisfactory service as is economically possible and the home rule committees have been invaluable in presenting fairly to the public the railway viewpoint. The fare on each division is determined by the character of the service rendered in that particular territory and by the number of car riders there. The resulting condition is practically "service at cost," or service based upon the ability and willingness of the local population to support it.

ROBERT B. STEARNS

Nine years ago Robert B. Stearns, then vice-president of the Milwaukee Electric Railway & Light Company, was elected vice-president and general manager of the Bay State Street Railway. His task was difficult. The road was virtually bankrupt, after years of operation of a system loosely knit together from two groups of merged properties. Mr. Stearns played a large part in the preparation of a plan for relief, which included a reorganization of the system into the Eastern Massachusetts Street Railway under state control and a reduction of losses through curtailment of lines which never could be made to pay.

The success which has attended the operation of the road under the leadership of Mr. Stearns testifies to the soundness of the methods used and to his ability in making them effective.

Things had reached such a state in 1919 that if some radical step had not been taken it would have been impossible to continue operating the system. Thus it was that the Eastern Massachusetts Street Railway was among the first in the country to adopt for general use in a large way the one-man idea. Being somewhat of a pioneer in this field, the company had to educate the public to the merits of this new departure and to dispel the general impression fostered by the trainmen's unions that one-man operation was unsafe and generally inimical to the public welfare. This could not easily be done with old, double-truck rolling stock which had been equipped with safety devices and one-man equipment or even with modern double-truck, one-man cars. It was necessary, therefore, to purchase a large number of Birney cars for this educating process. Coincident with the purchase of these cars, however, the work of equipping existing rolling stock for the new method of operation was undertaken, this modernization being limited to cars of fairly recent origin and of good physical condition. Gradually these cars were placed in service, the process being so gradual that few individuals in the several communities seemed even cognizant that a change was being made.

Some 2½ years ago the company invested in 75 new light-weight, double-truck cars designed for one-man operation. These cars weigh approximately 32,000 lb. and possess many features which particularly recommend them for establishing finally the idea of one-man operation in the minds of the public. Among these factors of comfort and convenience were to be found: Especially large platforms, wide double folding doors, construction of vestibule involving but two large windows with one center post, thus insuring maximum visibility on the part of the operator; safety switch box with a safety panel, including all operating switches; a modern lighting system, consisting of four 94-watt lamps equipped with automatic compensating fixtures in series with the 94-watt headlight; air-operated slack adjusters, variable load brakes, staggered arrangement of seats to provide a maximum aisle clearance and control of rear door by the operator.

All of the cars destined for one-man operation, of whatever vintage, were supplied with automatic control cords in the centers of the passenger compartments, which may be used by passengers to stop the cars in an emergency. These cords fulfill the triple duties of cutting off the power, applying the brakes and releasing both front and rear doors. Complete standard safety device equipment was not applied to the cars as certain regulations of the state of Massachusetts made necessary a number of modifications. It was found possible to equip the cars with the emergency passenger control at a cost of less than $100 per car.

In addition to the 250 Birney cars purchased to inaugurate the one-man operation and the 75 new double-truck cars, 457 older double-truck cars were re-

Table II—Reduction in Personnel

	Maintenance of Equipment			Transportation		
One Week	Supervisory	Productive	Total	Supervisory	Productive	Total
1919	122	817	939	156	2776	2932
1920	92	532	624	111	1785	1896
1921	64	421	485	100	1149	1249
1922	63	364	427	98	1125	1223
1923	56	323	379	98	1114	1212
1924	53	273	326	90	1086	1176
1925	49	236	285	88	1050	1138
1926	51	253	304	86	1075	1163

NOTE—A week in November was chosen for the years 1919-1925 and the week June 19-26 for 1926.

Table III—Cost of Car Maintenance Exclusive of Fixed Charges*

1918	5.02 cents per revenue car-mile
1919	5.69 cents per revenue car-mile
1920	6.20 cents per revenue car-mile
1921	4.63 cents per revenue car-mile
1922	4.42 cents per revenue car-mile
1923	4.06 cents per revenue car-mile
1924	3.60 cents per revenue car-mile
1925	3.04 cents per revenue car-mile
1926 (six months)	3.20 cents per revenue car-mile

*NOTE—Includes overhauling and painting.

One of 75 double-truck, light-weight cars, some of which are now being re-equipped for improved interurban service

constructed. Thus it was possible ultimately to retire 400 double-truck cars of obsolete design and also to retire a great variety of trucks, motors and air equipments.

Air brake equipment on the property has been standardized to such an extent that at the present time only two types of compressors are used on active passenger equipment. These are the CP-27 and the DH-16. Automatic heat regulators have been installed on all cars to effect savings in current consumption and to improve the comfort of passengers.

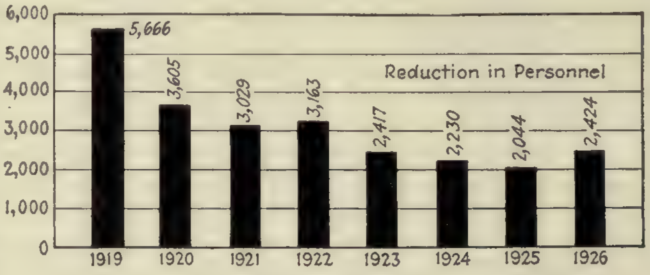
Not only the passenger cars have been subjected to the modernization process—the service equipment has also come in for its share of attention. Twelve new double-truck Russell sweepers have been added to the snow-fighting equipment and extensive remodeling of existing plows and scrapers has been carried out, that the equipment might attain its greatest efficiency. Emergency and service cars have been rebuilt and re-equipped to render them effective for all types of service calls.

Having placed the existing rolling stock of the company in a condition of uniform efficiency and good physical appearance, it is now planned to devote considerable attention to the dressing up of a number of the latest double-truck cars for the de luxe suburban service. Leather-upholstered seats, with divided backs and spring cushions, are being constructed by the Heywood-Wakefield Company of Wakefield, Mass., along lines especially designed for the Eastern Massachusetts Company. It is planned to carry out the work quite extensively and to improve much of the newer rolling stock in this way. In addition to the special seats the de luxe

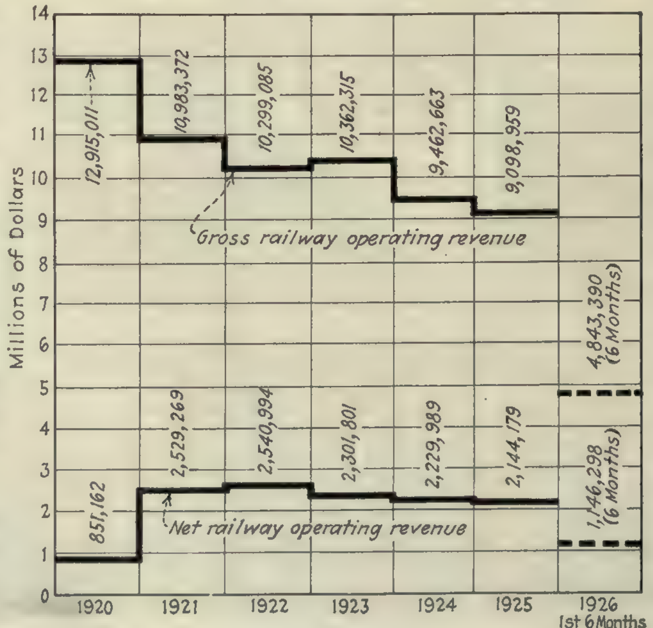
Semi-convertible car, approximately nine years old, which has been modernized for up-to-date service

One of the older semi-convertible units which will be among the next cars to be replaced with new equipment
Although in good physical condition their weight renders them uneconomical for use

cars are to have battleship linoleum floor covering. Copper brass edging is to be placed around all of the trapdoors, to make a neat fit with the linoleum, and all of the piping at the ends of the cars will be inclosed in a wood partition with an aluminum casting over the top. The total cost of equipping each of the cars with these improvements will be approximately $1,500 per car. The use of the de luxe seats reduces the seating capacity of the cars from 42 to 40. When new cars are purchased to replace the older rolling stock now in service it is planned to have them equipped with the de luxe furnishings in the same fashion as the ones which are now to be prepared. Thus the entire system, both interurban and urban, will eventually be rendering an even higher grade of service to its patrons, both in mechanical excellence and in physical comfort and appearance.



Total personnel in all departments during a typical week in each year



Gross and net operating revenues from January, 1920, to June, 1926

This work is all part of the campaign which the company is carrying on to meet the private automobile on its own ground by providing comfortable, convenient transportation. It has backed up the improvement of comfort by careful maintenance of headways and schedules, the placing of safety zones and staggered stops and the maintenance of the cars in a clean and sanitary, well-painted condition.

As has been stated, the company has lifted itself from a condition perilously near bankruptcy to a situation in which it may now go out in the open market and interest investors in its securities with an attractive array of figures. It is true that the gross railway operating revenue, exclusive of power sales, has been diminishing each year since 1920, when material slashes in fares were made, but the operating economies have proved so efficacious that the net has slumped but little. The falling off in gross hardly needs explanation; the same conditions which have confronted every street railway property in the country to a greater or less degree during the past few years have not failed to affect the Eastern Massachusetts. Some of the divisions have fared better than others, for the company serves communities of widely varying characteristics and local conditions frequently differ quite materially from the general economic status of the country. All, however, have felt the effect of the private automobile and it has required courage to rally to the fight and to carry the struggle into the very citadel of the foe. With the launching of the counter attack, which consists of carefully planned merchandising efforts to popularize street car travel and with a secondary line of defense made up of the maintenance and transportation preparations which have been described, both gross and net earnings have reacted encouragingly this year.

The abrupt rise in the net earnings in 1921 which is shown in the chart at the left was occasioned by the substitution of the 250 Birney cars for the obsolete, heavy, two-man cars which had previously been in service. From that time on the proportion of one-man operation increased rapidly until today practically 96 per cent of all cars are one-man operated. While every year since 1922 has shown a slight decrease in the net earnings, indications are that the tide has been stemmed with the present year and that the net earnings may be expected to show an encouraging total at the end of the fiscal year.

Another chart shows the reduction in personnel in all departments of the company since 1919, as indicated by a typical week in each year. The total number employed in 1919 was 5,666, a payroll which was literally "eating its head off" on the basis of the actual business done. This total was reduced to 3,605 in the week shown for 1920, as the one-man cars were placed in service toward the end of that year and prior to the week in November that was taken as the criterion. Since 1920 the reduction has continued slowly but steadily in all departments, the maintenance and transportation departments being the ones chiefly affected by the adoption of modern, light-weight, one-man cars. Table II gives the yearly progress in these two departments, and it is apparent from an examination of the detailed records maintained by the company that considerable credit must be given to departmental economies, in addition to the savings effected by the cars themselves, for the records which have been established.

Special leather - upholstered seat which has been adopted for the de luxe interurban cars

Steadily decreasing cost of car maintenance is a direct result of two factors—modernized equipment and improved maintenance practice. Table III presents the yearly record for the cost of car maintenance per revenue car-mile, exclusive of fixed charges. The decrease from 5.02 cents per car-mile in 1918 to 3.20 cents in the first six months of 1926 represents an enormous saving on a property operating as many units as the Eastern Massachusetts company does. In 1918 a total of $1,361,000 was spent for maintenance requirements, while during the first half of the current year only $292,625 was expended.

Correlative to this diminution which has occurred in the maintenance account has been the decrease in pull-ins throughout the system. In 1919 a maintenance pull-in was necessitated on the average of once every 1,550 passenger-car-miles. The current year saw the mileage per pull-in increased to 18,838 miles during the first six months. Careful inspection and thorough overhauling have made pull-ins dependent upon unforeseen contingencies rather than a part of the daily routine. The fact that the entire rolling stock of the company has been placed in first class condition and that a large amount of it is of recent origin is of course significant.

Interior of one of the newer light-weight cars which are being equipped with de luxe seats and other features

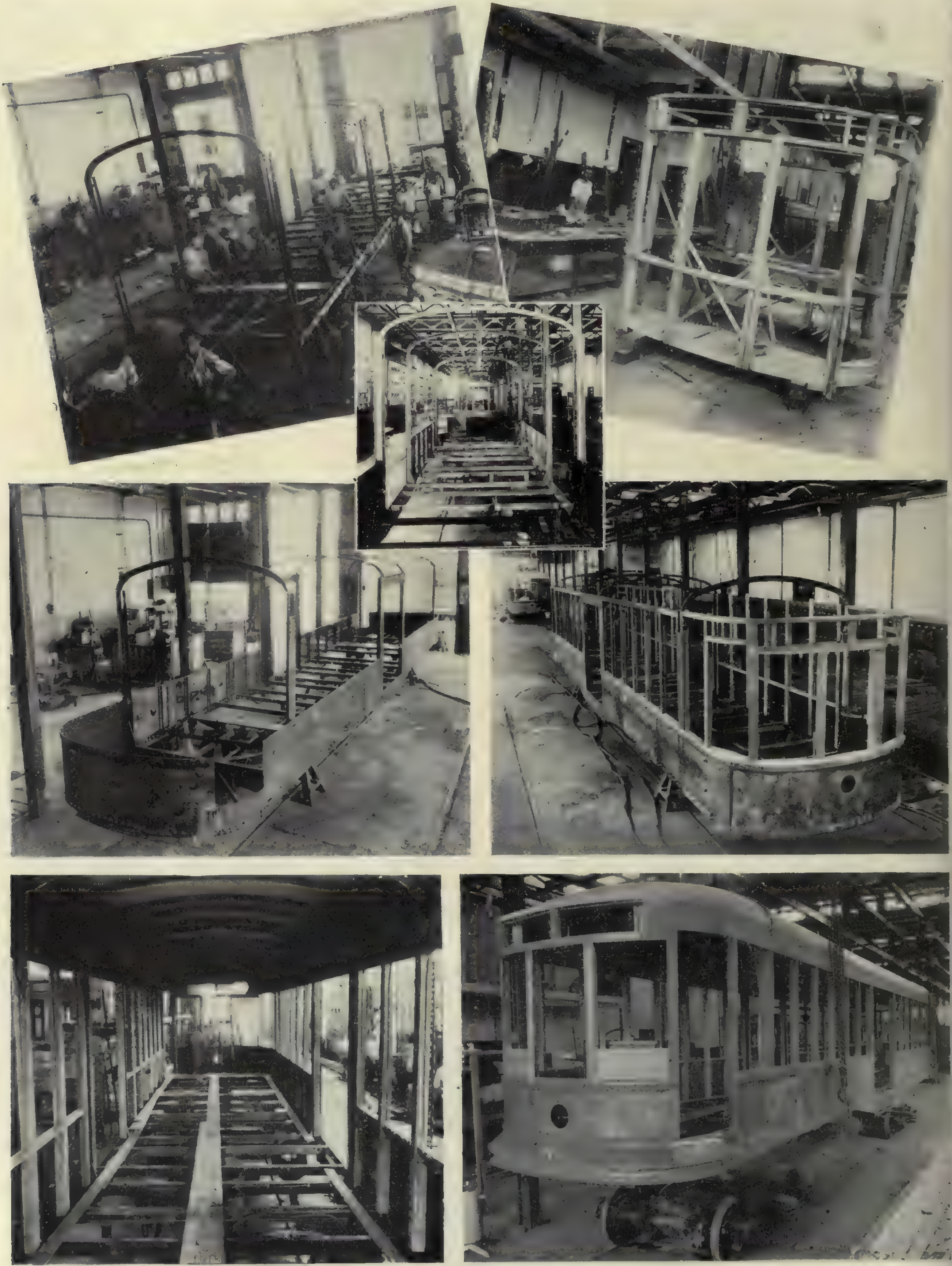
While the net operating revenue has remained at a gratifying point, however, the interest charges which must be met each year have declined materially. The total net earnings before depreciation have been equivalent to more than 2.3 times combined interest charges and rentals in each of the past four years, and in 1925 the earnings were 2.5 times rentals and interest charges, the best showing ever made by the company.

For several years the company considered it expedient to bend every effort toward placing its house in order. Now a determined merchandising program has been launched, with the boosting of the gross as a primary object. Following careful study of the various lines of the company and the local attractions which might be enlisted in a campaign to attract new riders to those lines, extensive excursion rates were established at many points. Reductions in round-trip fares and special arrangements with various steamboat companies for coordinated schedules and jointly reduced fares have been made.

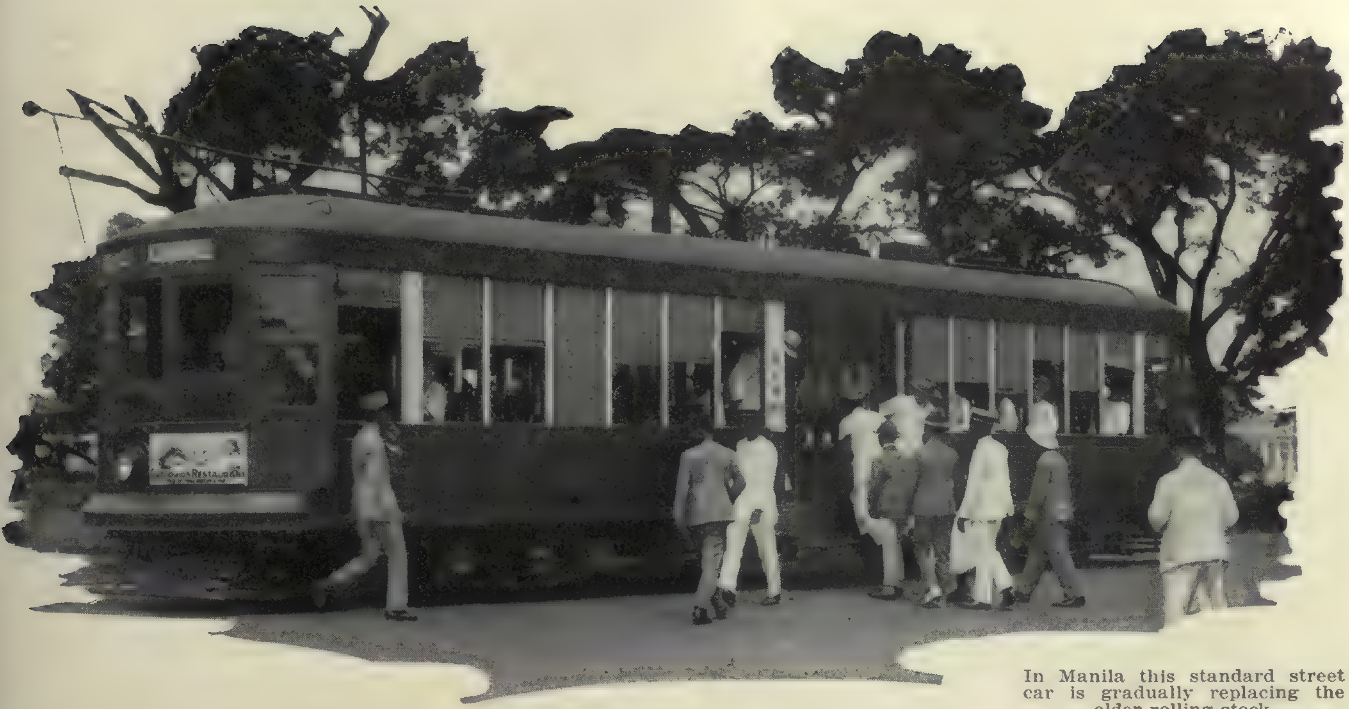
Adding three coupons to excursion tickets on lines serving various amusement parks is another scheme which has been tried with good results. The coupons are each good for a single amusement at the parks which have concurred in the plan, being redeemed by the railway company when presented by the concessionaires. The coupons are valid only on weekdays, from Monday to Friday inclusive, and exclusive of holidays.

A further ingenious plan was the sale of tickets at $1 each in Lowell. These tickets were in two parts, one being good for a dollar's worth of merchandise at any co-operating store, while the other section entitled the bearer to two rides on Tuesday, the "free riding day." The railway redeems the ticket at 90 cents.

As a result of these and sundry other schemes which have been tried out by the company a marked increase has already been apparent in the number of car riders and, correspondingly, in the gross operating revenue. Strong efforts are being made to increase pleasure riding and, by rendering attractive service, to encourage new riding by persons who have hitherto relied upon an automobile. The campaign to merchandise trolley riding has only begun and company officials are encouraged by results already obtained to go ahead with more extensive plans.



Building new standard cars in the shops of the Manila Electric Company. Steel underframing is used with wood and steel superstructure



In Manila this standard street car is gradually replacing the older rolling stock

Manila Finds Car Replacement More Profitable Than Rebuilding

Rather than rebuild its old rolling stock two years ago the railway adopted a new design as standard and commenced to retire the old equipment from service. Results have been extremely satisfactory

By J. C. ROCKWELL
*Vice-President Manila Electric Company,
Manila, P. I.*

STREET railway service in the city of Manila and its suburbs, with a total population of 360,000, is furnished by the Manila Electric Company. To the original rolling equipment with which operations were begun in 1905, additions were made from time to time until in 1923 the company found itself with nine different types of cars. It was then necessary to rebuild or replace a large number of them. Replacement, while more costly, was thought likely to be cheaper in the long run and a new light-weight car was designed. Forty have been built and placed in service during the last two years. They have proved to be satisfactory in every way and it is planned to continue the replacement of old cars by new cars of this type.

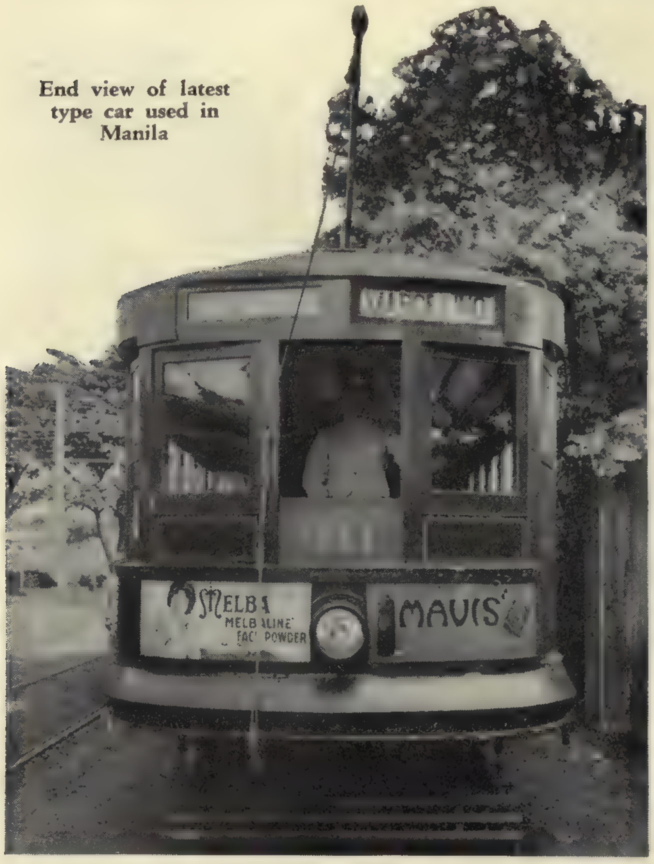
That hardy old perennial "local conditions," probably the most potent preventive of standardization of car design at home, develops new characteristics in foreign climes and attains a luxuriant growth in the tropics. Manila, the "Pearl of the Orient," is both foreign and tropical, so the company has its own local conditions and resulting problems. Chief among them affecting car design are: Character and psychology of the traveling public, climate and weather conditions and remoteness from sources of supply.

Our clientele consists almost entirely of Filipinos, with a small number of Chinese and other Orientals. Other foreigners are few in number and for the most part they have their own conveyances. Filipinos, being small in stature, do not take kindly to high steps, and being leisurely by nature, respond not at all to the exhortation to "step lively." According to franchise requirements, provision must be made for two classes of passengers.

Dryness is the rule for six months out of the year, during which two to three months of very hot weather is experienced. During the remaining six months rains are frequent and a few typhoons pass over the islands, bringing with them wind velocities from 60 to 80 m.p.h. and heavy precipitation. This varies from a few inches to as high as 20 in. in 24 hours. The streets are paved with water-bound macadam to a large extent, and in wet weather quantities of grit and water are thrown against underframings by the wheels. In conjunction with the tropical climate, this causes rapid deterioration of steel parts, especially in the case of small members.

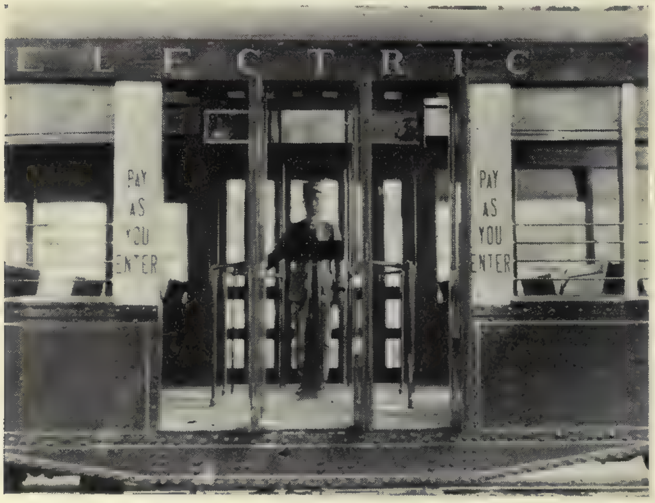
Longitudinally opposite Cape Breton, Nova Scotia, and having the same latitude as San Salvador, Manila is about as far from American manufacturing centers as possible. Receipt of supplies is from six to eight months removed from the date of order. A ship goes aground near Panala and there is a shortage of brake-

End view of latest type car used in Manila



shoes unless stocks are ordered well in advance of requirements. A trolley pole wraps itself lovingly around a span wire and a car may have an enforced vacation unless such contingencies have been provided for. Because of the great distance between Manila and the United States, the Manila Electric Company builds its own cars.

In an attempt to obtain least possible weight per passenger, it was decided to use the smallest wheels and axles practicable; the lightest truck obtainable; the smallest motors that would do the work and to put on the trucks the largest, lightest weight body that would meet our requirements. Due to the limitations of the Filipino as a motorman or conductor, single-truck, one-man cars were considered impracticable. A body large enough to utilize the full capacity of the lightest truck obtainable could not be built on account of clearance at corners of old Spanish streets, which are quite narrow. Nevertheless the satisfactory result of 574 lb. per passenger seat was obtained.



Provision is made for two classes of passengers. Entrances at the center lead into each end of the car

The Atlas truck was chosen because in addition to being as light as any then available, it can be repaired to a large extent with standard shapes. The GE-247-B motor was adopted because the company already had a number of them in service.

Use of Standard Shapes Has Simplified Design of the Car Framing

The most outstanding feature of the car is the construction of the body framing entirely from standard shapes. Investigation showed that special shapes would have resulted in very little saving in weight and the resultant energy saving would not have paid the interest on the extra cost. Aside from the obvious advantages of standard shapes and the fact that they are generally available in Manila, it should be pointed out that they called for a very simple design. This is important because the cars are built in the company's shops with native labor, which at best is unskilled as compared with that at home.

Experience has convinced us that the center-entrance car is desirable for handling two classes of passengers, and a stepless car is preferable for facilitating loading and unloading. The latter, however, had to be abandoned reluctantly because of complications in design and resultant higher costs. By using small wheels and a slight ramp the floor level has been brought sufficiently low so that only one step is necessary. By having this a folding step rather than built in, a break in the side sills has been avoided.

While closed cars had proved satisfactory in all kinds of weather, it was decided to build center-aisle open cars and save weight. Previous experimentation had demonstrated that it was possible to keep cars dry with well-battened curtains properly fitted in deep grooves. Extra weight would have been involved to give the rigidity required by glass windows. The curtain grooves are ⅝ in. deep on the outside and 1¼ in. on the inside so that battens cannot spring out of them in hard blows.

The battens extend from the bottom of one groove to the other with very little clearance, and the curtains are cut the full width of the battens. While only mild typhoon weather has been experienced during the two years these cars have been in operation, they have been effectively tested by squalls and heavy rains. In really severe typhoons, which fortunately occur but once in several years, it is impossible to keep even closed cars dry. On these occasions, however, service is reduced more than half, since passengers are few and all ordinary business comes to a standstill until the storm has abated.

Safety Interlocking Devices Have Reduced Accidents

Our new standard cars are equipped with pneumatic safety interlocking door and step controls. This feature has been very successful and has saved us considerable expense. Filipinos are even more prone to "flip" cars than Americans, and with the older equipment boarding and alighting accidents are frequent. This class of accidents has been practically eliminated by the new car.

Many innovations in these new cars have proved popular with the public. They are featured by attractive appearance, interior comfort and quiet operation

RAIL COACHES
win their way in Grand Rapids

Increased revenue and reduced operating costs follow immediately the introduction of improved cars—Their effect on the public's attitude toward the railway is even more important from the standpoint of future earnings

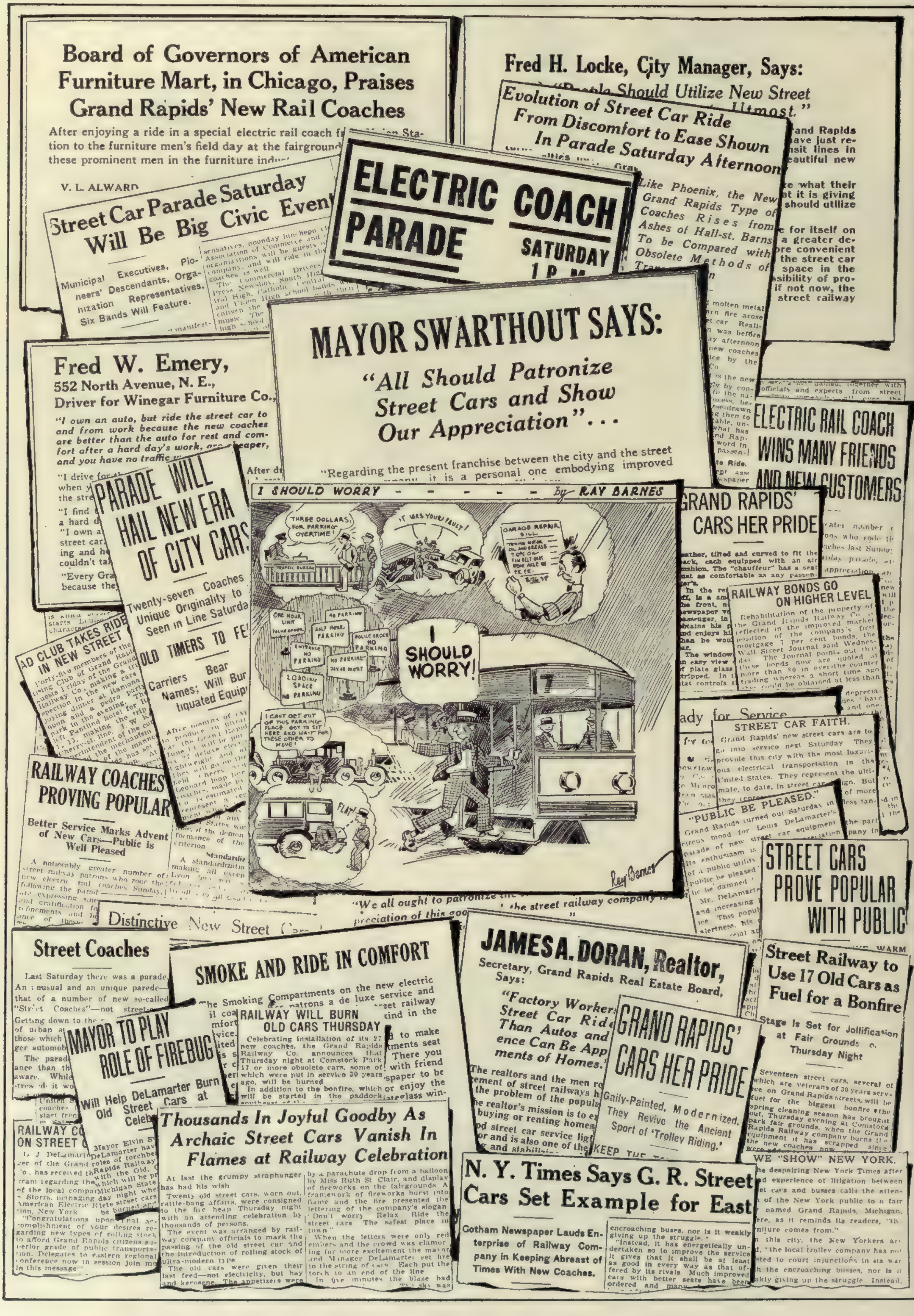
By L. J. DeLAMARTER

Vice-President and General Manager
Grand Rapids Railway

EVERY progressive railway manager is primarily concerned with the subject of making transportation pay. He realizes at the outset that public co-operation is vital to the successful accomplishment of that objective. Our general policy in dealing with present-day street car problems in Grand Rapids has been directed to the end of making it easy for the public and public officials to co-operate with the railway company. That, in a nutshell, is the key to the several steps taken by this property during recent years. It has been our object to make the people of the city proud of their transportation system and interested in its continued growth and development. Once that is accomplished, many other difficulties disappear. Public officials in themselves can help little if the people they represent are disinterested or antagonistic. Our purpose has been so to popularize the street railway as to make it easy for public officials to lend that co-operation which is so essential to progress.

The new cars which we recently obtained are an important means to that end. In addition they have in the short period of approximately three months demonstrated that they are a profitable investment, both from the standpoint of revenue and operating expense. On June 12 of this year our operations showed a decrease in revenue of approximately 1 per cent for the twelve-day period as compared with the same period last year. On June 13, 27 new coaches delivered to us by the St. Louis Car Company were put in service. Despite the continued operation of approximately 100 remaining old cars on the system, the figures for the month showed a net gain in rev-

A visual invitation to ride. Rail coaches in Grand Rapids are winning their way with the public



Board of Governors of American Furniture Mart, in Chicago, Praises Grand Rapids' New Rail Coaches

After enjoying a ride in a special electric rail coach fr Sta-
tion to the furniture men's field day at the fairground
these prominent men in the furniture indu

V. L. ALWARD

Street Car Parade Saturday Will Be Big Civic Event

Municipal Executives, Pioneers' Descendants, Organization Representatives, Six Bands Will Feature.

sensatives, noonday luncheon cl
Association of Commerce and
organizations will be guests o
company, and will ride in the
coaches is well
The Commercial Drivers
Press Newsboy, South Hig
tral High, Catholic Central
and Union High school bands w
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ELECTRIC COACH PARADE

SATURDAY 1 P. M.

Fred H. Locke, City Manager, Says:

"People Should Utilize New Street
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Evolution of Street Car Ride From Discomfort to Ease Shown In Parade Saturday Afternoon

Like Phoenix, the New Grand Rapids Type of Coaches Rises from Ashes of Hall-st. Barns To be Compared with Obsolete Methods of Tran n

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MAYOR SWARTHOUT SAYS:

"All Should Patronize Street Cars and Show Our Appreciation"...

"Regarding the present franchise between the city and the street
mpany it is a personal one embodying improved

"We all ought to patronize the
the street railway company
preciation of this goo
"

Fred W. Emery,

552 North Avenue, N. E.,
Driver for Winegar Furniture Co.,

"I own an auto, but ride the street car to and from work because the new coaches are better than the auto for rest and comfort after a hard day's work, are cheaper, and you have no traffic

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PARADE WILL HAIL NEW ERA OF CITY CARS

Twenty-seven Coaches Unique Originality to Seen in Line Saturda

OLD TIMERS TO FE

Carriers Bear Names; Will Bur tiquated Equip

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AD CLUB TAKES RIDE IN NEW STREET

Forty-five members of the
tising Club of Grand Rapi
guests Friday of the Grand
Railway Co., making a tri
spection in the new cars
joying dinner at Ramona
noon and a pedro party
park in the evening. The
left Pantlind hotel for R
1:15, making the trip
Cherry-st. line. I. W. K
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RAILWAY COACHES PROVING POPULAR

Better Service Marks Advent of New Cars—Public is Well Pleased

A noticeably greater number of
street railway patrons who rode the
new electric rail coaches Sunday
following the parad
are expressing sinc
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ELECTRIC RAIL COACH WINS MANY FRIENDS AND NEW CUSTOMERS

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GRAND RAPIDS' CARS HER PRIDE

eather, tilted and curved to fit the
back, each equipped with an air
cushion. The "chauffeur" has a seat
just as comfortable as any passen-
ger's.

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newspaper v
passenger, in
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RAILWAY BONDS GO ON HIGHER LEVEL

Rehabilitation of the property of the Grand Rapids Railway Co. is reflected in the improved market position of the company's first mortgage 7 per cent bonds, the Wall Street Journal said Wednesday. The Journal points out that these bonds now are quoted at more than 80 in over-the counter trading whereas a short time ago they could be obtained at less than

ady for Service

STREET CAR FAITH.

Grand Rapids' new street cars are to go into service next Saturday. They provide this city with the most luxurious electrical transportation in the United States. They represent the ultimate, to date, in street car design. But they represent

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"PUBLIC BE PLEASED."

Grand Rapids turned out Saturday in
circus mood for Louis DeLamarter's
parade of new street car equipment
Its enthusiasm is
of a public utility
public be pleased
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Mr. DeLamarte
and increasing
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STREET CARS PROVE POPULAR WITH PUBLIC

WARM

Distinctive New Street Cars

Street Coaches

Last Saturday there was a parade.
An unusual and an unique parade—
that of a number of new so-called
"Street Coaches"—not street
Getting down to the
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SMOKE AND RIDE IN COMFORT

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RAILWAY WILL BURN OLD CARS THURSDAY

Celebrating installation of its 27 new coaches, the Grand Rapids Railway Co. announces that Thursday night at Comstock Park 17 or more obsolete cars, some of which were put in service 30 years ago, will be burned.

In addition to the bonfire, which will be started in the paddock

MAYOR TO PLAY ROLE OF FIREBUG

Will Help DeLamarter Burn Old Street Cars at Celeb

Mayor Elvin Sw
DeLamarter hav
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Rapids Railway
with the Old, C
which will be pr
Michigan State
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RAILWAY CO ON STREET C

L. J. DeLamarte
ger of the Grand
Co., has received th
gram regarding the
of the local compa
Storrs, managing
American Electric R
tion, New York

"Congratulations upon al accomplishment of your desires regarding new types of rolling stock to afford Grand Rapids citizens superior grade of public transportation. Delegates to eastern regional conference now in session join me in this message."

Thousands In Joyful Goodby As Archaic Street Cars Vanish In Flames at Railway Celebration

At last the grumpy straphanger has had his wish.

Twenty old street cars, worn out, rattle-bang affairs, were consigned to the fire heap Thursday night with an attending celebration by thousands of persons.

The event was arranged by railway company officials to mark the passing of the old street car and the introduction of rolling stock of ultra-modern type.

The old cars were given their last feed—not electricity, but hay and kerosene. The appetizers were by a parachute drop from a balloon by Miss Ruth St Clair, and display of fireworks on the fairgrounds. A framework of fireworks burst into flame and the fire presented the lettering of the company's slogan "Don't worry. Relax. Ride the street cars. The safest place in town."

When the letters were only red embers and the crowd was clamoring for more excitement the mayor and Manager DeLamarter set fire to the string of cars. Each put the torch to an end of the line.

In five minutes the blaze had
The sky was

JAMES A. DORAN, Realtor,

Secretary, Grand Rapids Real Estate Board, Says:

"Factory Workers Street Car Ride Than Autos and ence Can Be App ments of Homes."

The realtors and the men re
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buying or renting homes
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GRAND RAPIDS' CARS HER PRIDE

Gaily-Painted, Modernized, They Revive the Ancient Sport of 'Trolley Riding.'

KEEP THE

Street Railway to Use 17 Old Cars as Fuel for a Bonfire

Stage Is Set for Jollification at Fair Grounds on Thursday Night

Seventeen street cars, several of which are veterans of 30 years service on Grand Rapids streets, will be fuel for the biggest bonfire the spring cleaning season has brought out, Thursday evening at Comstock park fair grounds, when the Grand Rapids Railway company burns the equipment it has scrapped since the new coaches now were ad

N. Y. Times Says G. R. Street Cars Set Example for East

Gotham Newspaper Lauds Enterprise of Railway Company in Keeping Abreast of Times With New Coaches.

encroaching buses, nor is it weakly giving up the struggle.

"Instead, it has energetically undertaken so to improve the service it gives that it shall be at least as good in every way as that offered by its rivals. Much improved cars with better seats have been ordered and many

WE "SHOW" NEW YORK.

The despairing New York Times after
d experience of litigation between
et cars and busses calls the atten-
n of the New York public to a fair
y named Grand Rapids, Michigan,
ere, as it reminds its readers, "th
rniture comes from."

n this city, the New Yorkers ar
d, "the local trolley company has no
sted to court injunctions in its war
h the encroaching busses, nor is it
akly giving up the struggle. Instead,

Newspaper clippings reflect the public's reaction to improved railway service enue passengers of 2.03 per cent. From the time that the new coaches were put in operation until Aug. 21 they were responsible for increasing revenue on the lines over which they were operated 6.22 per cent—the net increase for the system being 3.3 per cent. This period covers the middle of the summer season.

Platform cost has been reduced 13.5 per cent from June 13 to Aug. 21. This has come from the extension of one-man operation on the new cars. Trainmen are delighted with their performance and take a new pride in their operation. This in turn has produced a marked improvement in their relations with car riders.

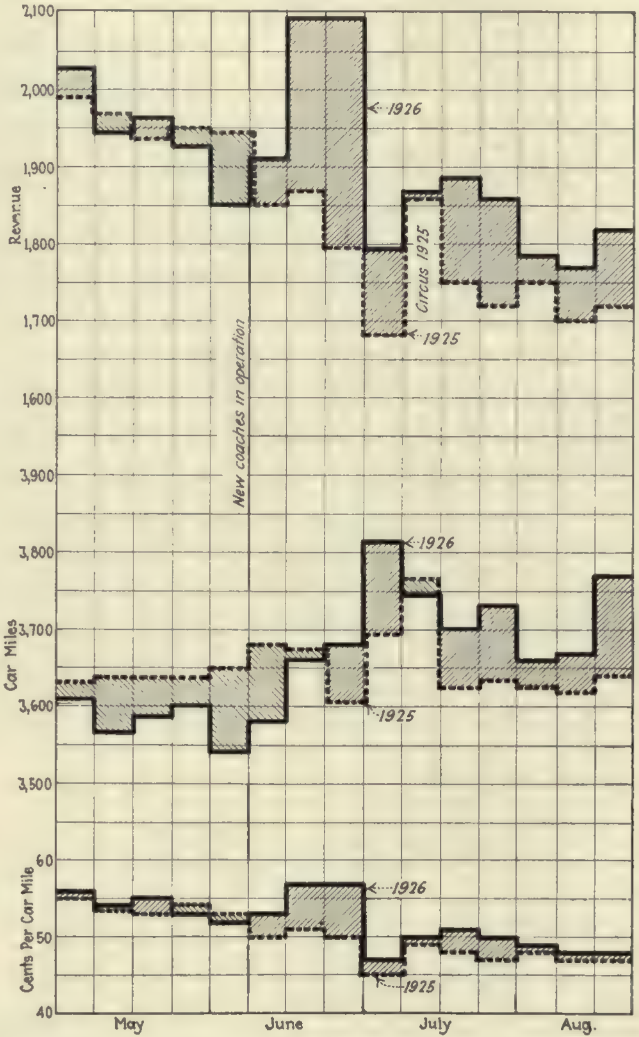
Average consumption of power per mile for the new rail coaches is 2 kw.-hr. as against 3.5 kw.-hr. for the older equipment which was supplanted. Actual reduction in power used on the system for the month of July, 1926, compared with the same month in 1925 was 56,829 kw.-hr. or 6.39 per cent. From meter readings to date we anticipate a reduction of approximately 6.5 per cent in August compared to the same month last year.

Maintenance of the new equipment has been 0.59 cent, 0.68 cent and 0.53 cent per car-mile for June, July and August respectively compared to 2.54 cents, 2.05 cents and 2.28 cents during the same months for the total of 127 cars operated on the property. This large reduction cannot, of course, be maintained, but it is reasonable to expect a substantial saving over a number of years.

Following the war, the Grand Rapids Railway found itself in the same condition as many other street railways—a run-down physical property, this condition being brought about by heavily increased operating cost, inadequate revenue, burdensome taxes and a public which had to a large extent lost interest. During recent years we have endeavored to win back that public interest, for without it the average street railway system is foredoomed to failure.

From public interest grows appreciation of the essential nature of the service rendered, public friendship, public patronage, fair franchise terms, adequate rates of fare, and relief from burdensome taxation. All of these have not been accomplished in Grand Rapids, but we are making progress in that direction. We have won a fair franchise and a reasonable fare structure. Public officials are taking a constructive view of the tax situation and we are hoping to obtain further relief in that direction, particularly in the matter of obviously unfair paving charges. We have sought the public's interest by offering the people of Grand Rapids a form of street car transportation of which they can be proud. We have sought increased patronage by endeavoring to increase the attractiveness of our product. We have endeavored to provide a common carrier vehicle on rails on which the average citizen could ride without feeling consciously or unconsciously associated with an obsolete service that is behind the times.

Our results so far indicate the wisdom of the policy followed. There is a cordial spirit of co-operation between public officials and the company. There is an appreciation of the mutual interest which both city and company have in the development of a high-grade prosperous transportation service. All questions affecting the railway are approached in this spirit of mutuality of interest. In bringing about that condition we feel that we have made the first all-important step in making transportation pay. And as the result of our experience to date with improved street cars, we feel assured that electric railways generally may well give increased attention to the condition of their cars. Attractive new cars properly operated go a long way toward building public friendship, increasing earnings and reducing operating costs.



Revenues increased above 1925 figures on three lines with new cars. Before their installation, 1926 was running behind 1925

Grand Rapids Railway Comparison Operating Statistics 1926 and 1925—Total System*

Month	Per Cent Increase or Decrease 1926 over 1925 April	May	June	July	Aug.
Total operating expenses—cars	***2.35***	***0.57***	***5.69***	***6.68***	***10.44***
Gross income after taxes	**16.23**	***1.22***	**18.19**	**25.14**	**33.29**
Kilowatt-hours used — All power at d.c. buses	**7.95**	**0.36**	***1.39***	***6.39***	***9.0***

*Note—Thirty new cars in operation June 13 out of total of 127 cars on system.
Decreases shown in *italics*.

The results accomplished from the operation of our new cars are clearly set forth in the accompanying curves and tabulations. There had previously been a wide public interest in our plans following a year of experimental work in the attempt to develop an improved type of car. The public, understanding that we were making a sincere effort to provide the best form of street car that we knew how to obtain, was extremely patient and forbearing during this protracted period of waiting. To understand fully the degree of co-operation accorded on the strength of our expressed intention to provide new cars, it must be remembered that the system had been badly crippled by the loss of 58 cars in a disastrous carhouse fire on July 14, 1924, and that there were being operated on the streets of Grand Rapids such old and worn cars as could in the emergency be borrowed or rented from other railway properties, regardless of their physical condition.

IN THE ATTRACTIVENESS and popularity of the new cars put on the streets of Grand Rapids by its railway company lies the key to building public interest and friendship. That alone will enable railway companies to win adequate rates of fare, relief from paving burdens and unfair franchise terms. Without popular support, public officials are powerless to deal intelligently and fairly with the problems of improving street railway service.

EDWIN F. SWEET

Grand Rapids City Commission,

Formerly Vice-Chairman Federal Electric Railways Commission.

(Statement by prominent member of city commission indicating public reaction obtained from new cars)

When the new cars were finally obtained and placed in service, there was a most favorable public reaction. Officials, business men, newspapers and citizens generally were loud in their praise of the improvement effected. Grand Rapids took a new pride in its street railway system. Visitors to the city were generous in their commendation. The community and the company were drawn closer together by a new bond of common interest. The state of the public mind and the delight of public officials reached its climax when Mayor Swarthout said freely that Grand Rapids had such cause to appreciate its local transportation system that it might well afford to subsidize the operation of the lines if that became necessary to continue the program of improvement thus auspiciously started. In interpreting the results accomplished with these cars, it is well to bear in mind that there are only 30 new cars, including the three sample cars initially obtained, out of a total of 127 operated on the property. Inauguration of the new equipment was appropriately introduced with a parade. So popular were the new cars that prominent descendants of early settlers after whom they were named were highly complimented at the honor bestowed on their ancestors. Many other prominent people, civic and community organizations urged the company to do them similar honor in naming future new equipment.

What a contrast there was in this condition! The street railway became something to be proud of—not a disreputable necessary nuisance to be kicked about as a political football. It is now looked on as a valuable and desirable service that offers Grand Rapids a necessary agency for continued development. There is a growing sentiment in favor of curtailing the privileges of individual vehicles in order that street car service may be further improved. But it was only a few years ago that a city official felt uncomfortable and politically shady if seen talking in public to the manager of the railway!

Two steps are no small part of the convenience offered in the Grand Rapids car

The groundwork for our improved relations in Grand Rapids was laid several years ago. There has been worked out a service-at-cost franchise mutually advantageous. The spirit of cordial relations between the public and its railway was in process of development. But that was brought about by the same demonstration of sincerity on the part of the company which led to the acquirement of the new rail coaches. The community did its part under the guidance of broad-gaged city officials. But upon the company lay the responsibility for demonstrating to the people themselves its own sincerity and worthiness.

When the new cars were placed in service the response on the part of the public in the form of increased riding was almost instantaneous. This was not a wild, mad rush to ride the cars, to be sure. But there has been a steady week by week increase in riding over the corresponding week last year. This is a reversal of the trend during the weeks preceding the introduction of the new cars. Up to that time there had been a steady decrease in riding this year over corresponding periods of last year.

There has been, in addition, a very encouraging reduction in operating costs for the new cars in comparison with the old equipment previously operated on the same lines. It is interesting to note that the costs for June and July, 1926, were lower than for the same periods in the last eight years. Both the increase in revenue and the reduction in cost have been obtained during the height of the summer season when use of automobiles, vacations and other summer attractions keep riding at a minimum. There is every reason to believe that the improvement shown during the first three months of new car operation will be materially increased during winter months and that the car riding habits established during the winter will in many instances be continued in the summer following. We are convinced that the new cars in Grand Rapids are paying—and paying well.

LUXURIOUS BUSES

amplifying rail service stimulate traffic in Washington

By J. H. HANNA

President Capital Traction Company, Washington, D. C.

The Capitol of the United States, the Library of Congress, the Union Station and many other important points in Washington are on the route of the Chevy Chase Coach Line

De luxe buses operated on Chevy Chase line of the Capital Traction Company give superior service at a fare higher than that of the street cars—Revenue increased steadily during the first eight months of operation

ALREADY a year has rolled around beneath the smooth spinning wheels of the Chevy Chase coaches, the parlor car bus line of the Capital Traction Company in Washington. Let us review the working out of the company's idea concerning the use of buses by electric railways to give special service at a fair price.

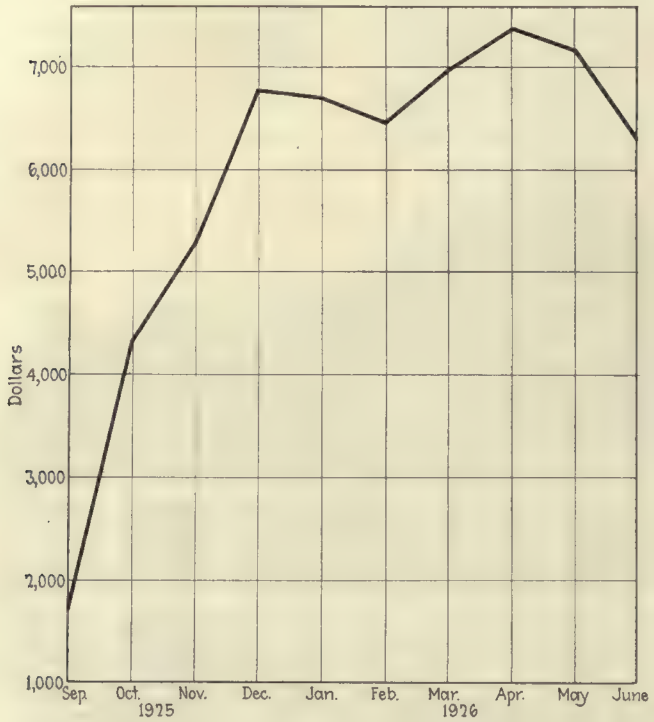
On Sept. 15, 1925, after much study and thought, the Chevy Chase Coach Line was established. The route begins at Chevy Chase Circle, which is the boundary of Maryland and the District of Columbia, and the center of the finest residential section of suburban Washington. It follows Connecticut Avenue in a southeasterly direction across Rock Creek Valley through the heart of the city and thence to the Union Station, the Capitol and the Library of Congress. The length of the route one way is a little over 8 miles, which is too long for the fare of 25 cents considering the type of service rendered. One way running time is 34 minutes, making the schedule speed 14.5 m.p.h.

Along the entire length of its route the coach passes or goes within one block of fifteen hotels, seven clubs, six schools, half a dozen churches, many government buildings, innumerable apartment houses and the principal office buildings, theaters and stores of the city. The company has posted framed schedule cards of the lines in many of the hotels, clubs and larger apartment houses. In addition to this, metal stop disks giving the time when coaches pass have been installed at practically all street corners along the route.

When service was first inaugurated on this line six type "Y" Yellow coaches were purchased. During the winter it was necessary to increase this number to eight. They are painted with a dark gray lower panel and light gray upper panel, separated by a belt line of the Capital Traction Company's standard light green.

Interiors are of polished walnut and each window post is equipped with a mirror, an innovation which has found much favor with the women, who constitute a large part of the traffic. Sliding window curtains of brown cloth are mounted on nickel fittings. The rear of the coach has a smoking compartment, divided from the main compartment by a glass partition with a door. This smoking compartment has one cross seat for five persons at the back and two double longitudinal seats.

Mechanically the coaches have been all that could be asked for. During the year they have operated approximately 350,000 miles, or more than 40,000 per bus. During this period there have been only two occasions when a coach was tied up for more than a few hours on account of mechanical trouble. There have been delays along the route, of course, on account of tire trouble, but delays from mechanical failures have been few and far between. In eleven months only twelve road delays have occurred from this source. The coaches are extremely quiet in operation and smooth in acceleration. In fact, the only complaint heard against them came from a lady who said that they are so quiet they cannot be heard approaching and consequently are a danger to pedestrians.

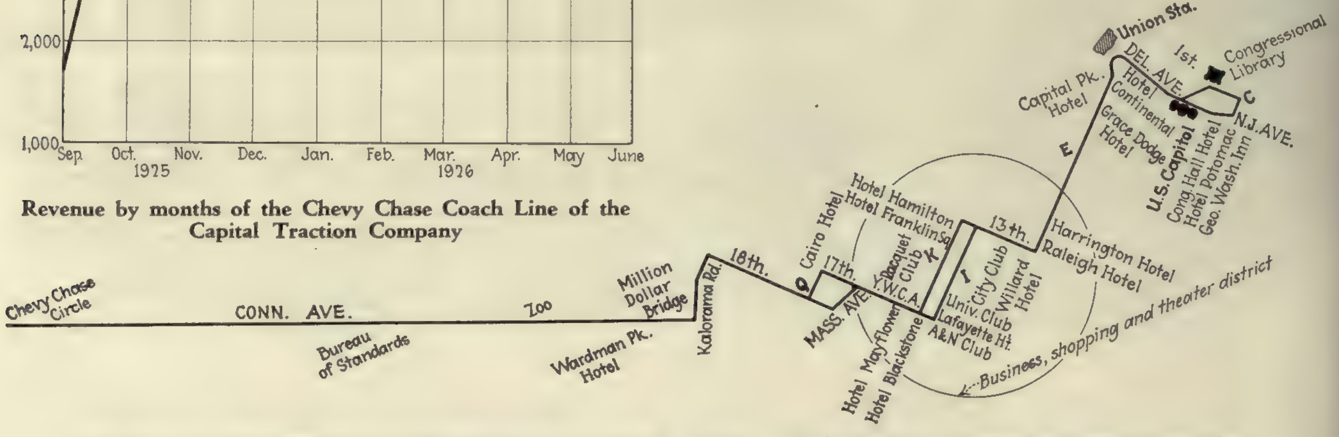


Revenue by months of the Chevy Chase Coach Line of the Capital Traction Company

Operators for the coach line are picked men. Selected for their neatness, courtesy and affability as well as driving ability, these men know they must give special service and do everything possible to satisfy the passengers. They assist with luggage, help ladies with children, stop between blocks for patrons, greet the passengers with a pleasant "Good Morning" or "Good Evening." These men understand that all automobilists are prospective patrons of the coach line and they are instructed to operate their vehicles so as not to incur the enmity of motorists. They gladly pull over to one side to let them pass. They try not to delay traffic when stopping for passengers. They keep up to the speed of general traffic so as not to be a hindrance in any way. Numerous words of praise for the line and many reported instances of such special services lead the company officials to believe that their ideas have been carried out and that the public appreciates this fact.

The company furnishes and maintains special tailored, olive green, whipcord uniforms with its monogram woven in red on the collars. As a newspaper man expressed it, "These men are not drivers, they are operators and resemble dashing aviators." For summer wear the operators have been furnished with special light tan sateen shirts which may be worn without coats. These shirts are purchased by the men, but the company pays for their laundering.

From early morning until midnight the coaches maintain a twenty-minute headway and between 8 and 9 in the morning and 4:30 and 5:30 in the afternoon a ten-minute headway. No standing passengers are allowed. The company experienced a little difficulty in maintaining this rule at first, as the operators did not like to pass up their regular riders, and people were perfectly willing to stand. The objections came, however, from those who had seats and over whom some one was standing. This difficulty was overcome by supplying more coaches, making a rigid rule that operators must not allow standing passengers and referring patrons desiring to stand to a neat card in the front of the coach politely requesting them not to ask for a violation of the rule.



The route of the Chevy Chase Coach Line connects the center of the business and shopping districts with the most high-class residential districts in Washington

Revenue increased steadily for the first eight months, as shown in the accompanying chart, reaching a peak in April. It was expected that patronage would drop off perceptibly in the hot summer months. This has happened and is attributed to the closing of Congress, as many of the patrons are Senators, Representatives and their assistants. To some extent also it is due to the flow of the people away to summer resorts, which is especially true of the class of passengers which the coach line carries. However, the year's operation will show that the pay load factor of 33⅓ per cent has been maintained.

During the year there have been only six cases of personal injury to any of the 276,000 passengers carried. All of these were slight, there being no serious accidents of any kind.

Early in the spring of 1926 the Capital Traction Company asked permission of the utilities commission to inaugurate similar service along Massachusetts Avenue. Permission for this operation has been denied, but it is hoped that it may be granted at a later date.

Transportation Service Keeps Pace with Atlanta's Growth

One of the new 3,000-kva. substations recently built by the Georgia Railway & Power Company to give higher voltage and permit faster operation of cars

New capital intelligently expended by the Georgia Railway & Power Company in improving its transportation facilities has been a sound investment

By FRANK L. BUTLER

Vice-President Georgia Railway & Power Company

NOT SO many years ago the executives of the street railway industry were being forcefully impressed with the necessity of making radical changes in the operation of their properties in order successfully to meet modern requirements in urban transportation. No longer would cars built fifteen and twenty, and even 25, years ago offer the mode of transportation to which the riding public had become accustomed by the almost universal use of the private automobile. An industry that had considered itself an inherent monopoly awakened to the fact that it was faced with keen competition. While this realization was disconcerting, it has served to bring to the forefront those qualities of initiative, foresight and courage that are a heritage from the pioneers in the street railway industry.

It was not a hard problem to find out what the public wanted. The class of service they demanded and the only kind that would prove attractive to them and meet their requirements had to be reliable, frequent, attractive, fast and economical. Service, to be reliable, means not only that the cars shall run day in and day out, every day in the year, but also that the cars shall run on regular schedules, evenly spaced headways and not be subject to undue delays caused by equipment failures, current failures or traffic congestion. While we do not believe that at the present stage of development of the industry it is possible to furnish a seat for every passenger, yet some reasonable car loading should be decided upon as standard and maintained.

To make the service really attractive to the riders embraces an even wider field. Not only should the cars and equipment be considered as coming under this head but also the track and trolley wire and the trainmen themselves. To meet modern transportation requirements the speed of the cars had to be increased, and this result had to be accomplished without any increase in accidents and in face of increased street congestion and the installation of numerous traffic signals. These things had to be brought about without any large increase in cost to the users of the service. While we in Atlanta have many improvements yet to make, certain definite progress along the above lines has been achieved by the Georgia Railway & Power Company.

Before any large investments for the rehabilitation of the property could be made the jitney had to be eliminated. This was a long, hard fight. After an extensive publicity campaign through newspaper advertising, car cards and dash signs the city was canvassed by our employees. These employees, working in pairs, visited the homes and carried the company's story direct to the people. With them they had petitions asking the City Council to eliminate the jitney. More than 37,000 signatures were obtained in this manner, and by action of the City Council the jitneys were ruled off Atlanta's streets in March, 1925.

IMPROVEMENT IN POWER FACILITIES HAS SPEEDED UP SERVICE

Previous to this the Council had authorized the company to abandon several lines that closely paralleled others and served no useful purpose in the transportation scheme. The elimination of this trackage had been recommended in a report made by the Beeler Organization. Also the rearrangement of car stops with the elimination of the unnecessary ones had been approved. Thus, with the decks cleared for action, the company proceeded with its plans for modernization. These plans affected a number of the company's facilities. Water-power plants in the course of construction in the mountains of northern Georgia were rushed to completion and new plants begun, additional 110,000-volt transmission lines were built and a large number of oil switches installed. This part of the country is subjected to severe lightning storms and the system had suffered from several bad shutdowns during these storms. Since the installation of these oil switches all trouble is localized and a dependable source of power is assured. Three 3,000-kva. modern railway substations have been built at load centers, and these, in addition to our older stations, have improved voltage conditions very materially and made possible higher speed of the cars.

Anticipating the Council's action, the company had placed an order in 1924 for twenty modern 48-seat, low-floor, city type cars for two-man operation, so designed that they could be converted later for one-man operation. These were delivered in the spring of 1925. Later 40 cars of a similar type, designed for one-man operation, were ordered and placed in service before the end of that year, being installed on five lines in place of 28-seat, two-man cars, giving these five lines an average of 47½ per cent increase in seats during rush-hour periods and saving the company $100,000 per year on platform wages alone.

Fifteen double-deck, gas-electric drive safety coaches were also ordered and placed in service on arrival. This coach service met a much-needed demand for transportation in two newly developed residential sections and more nearly met the requirements than would have been the case had the street railway lines been extended in this territory. When this service was started a straight 10-cent fare was charged with no transfers to the cars, it being the company's idea that a de luxe service, with a seat for every passenger, running to the business center of the city would be appreciated by these residents.

The operation of this new equipment, while by no means completing our plans, relieved the situation and gave us a chance to look around and perfect other plans for the future. Traffic conditions immediately after the elimination of the jitney were somewhat abnormal. By this I do not mean that the cars were unduly crowded, because this was not the case. The elimination of the jitneys confirmed our belief that they were furnishing no necessary service. They simply duplicated service already available. Just as soon as traffic on the cars had a chance to settle down to a stable basis careful riding checks were made on each line. These data were plotted to give the number of riders by 30-minute periods during the morning peak, the noon rush hours, the afternoon peak and at night. Estimates were then made of operating expenses of types of cars varying in capacity from 32 seats to 52 seats. This study was made to determine the most economical car for this system. The study showed that to meet the conditions on our lines we could standardize on two types—a 40-seat car equipped with four 25-hp. motors and a 48-seat car equipped with four 35-hp. motors.

These two types of cars were studied on each line and the estimated operating expenses compared. The lines themselves were next considered, as it was desirable to place the new cars on routes most subject to competition from private automobiles. The result of this study was the placing of an order for 60 cars for delivery in August and September of this year. A description of the cars is as follows:

Length over dashers	45 ft. 4 in.
Length over body	33 ft. 1 in.
Length of platform	6 ft. 1 in.
Height, rail to trolley board	11 ft. 2 in.
Height, rail to first step	15½ in.
Height of step to platform	14½ in.
Ramp in platform	3¼ in.
Post centers	29¼ in.
Clear height inside	7 ft. 11⅜ in.
Type	Double end, double truck
Seating capacity	48
Motors	Four 35-hp.
Wheels	26 in.

The color scheme on the 40 cars placed in service in the fall of 1925 and on the 60 cars now on order, which were to be delivered in August and September of this year, has been changed from our standard green to a lighter green under the water table with cream above and with an orange roof. This was done in order to distinguish the one-man cars from the two-man cars and to make them more visible and attractive on the street.

NEW CARS ARE A GOOD INVESTMENT

That these cars will pay for themselves we are assured from very careful estimates that have been prepared. The expected annual saving from the operation of the 60 new cars is $210,142. This is nearly 25 per cent on the investment. This total is the sum of the savings due to lighter weight, larger capacity, increased speed and one-man operation.

While the purchase of this equipment was warranted solely from operating economies, we should not lose sight of the fact that new cars offering improved service will build up revenue and help to improve public relations materially.

The purchase of new equipment has given the mechanical department an opportunity to bring the older cars up to a high state of repair. That it has taken advantage of this opportunity is shown by the car-miles operated per pull-in:

Pull-in Record Since 1921

Year	Car-Miles per Pull-in	Average Pull-ins per Day
1921	3,002	13.2
1922	3,820	9.9
1923	5,859	6.5
1924	9,341	4.04
1925	12,226	2.95
First six months, 1926	21,461	1.68

The report for June, 1926, shows that the daily pull-ins averaged only slightly over one. The average car-miles per pull-in increased to 36,398 miles, or more than twelve times the average only five years ago.

Latest type car used in Atlanta by the Georgia Railway & Power Company. It is estimated that new rolling stock on that system is yielding a return of approximately 25 per cent on the investment

This gratifying result was accomplished only after continuous effort. Some of the physical improvements made include reboring and centering G.E. 80 and Westinghouse 101 motors, working over motor leads, axle jumpers and cables, correcting defects in bar spacing of brush-holders, rewiring lightning arrester circuits and doing all work in a more complete and thorough manner. Periodic overhauling on a definite mileage basis has been a big factor in eliminating the weak spots. A general overhaul of the relations with the men was also a large factor. A greater interest was taken in their training and education. That they have responded is attested by the results of their work.

WAY AND STRUCTURES IMPROVED

Track and roadway in Atlanta have always been kept in a relatively high state of efficiency. While there was a certain amount of maintenance put off during the stress of the World War and also during the lean years following the business depression in the fall of 1920, we have practically caught up with this deferred maintenance. Also during the last few years many new jobs of special work have been installed to make the system more flexible.

In the report of the Beeler Organization to the city the rearrangement of car stops with the elimination of unnecessary stops was recommended. This report was approved by the Council and the Public Service Commission was then petitioned for authority to rearrange the stops in accordance with the Beeler recommendation. The request was referred to the commissioners' engineer and on receipt of his report public hearings were held on each stop affected.

While there was a certain amount of opposition to the elimination of a number of the stops, it was from purely individual motives, and when the commission's order was handed down many of the unnecessary stops were eliminated. Before this change the average distance between car stops was only 492 ft., while under the new location this has been increased to 657 ft. When this order went into effect the company purchased new signs and installed them throughout the system. These signs are enameled with black letters on an orange background. Their visibility is much better than the old signs. Many of these are placed on "one-minute anchor posts" and all are located so as to be opposite the entrance door where the car stops. The public has been told that the cars will stop with the door opposite the car stop sign and that riders can help speed up the service by gathering at the sign. They have responded well and very little time is now lost while a passenger walks the length of the car to board.

Many favorable comments have been made on the appearance of the trainmen in Atlanta. The men are encouraged to present a clean and neat personal appearance by being able to have their shoes shined and clothes pressed free of charge at all carhouses. There is a full-length mirror at each starter's office, above which are the words "Look at Yourself and See if You Properly Represent Your Company." A white shirt, white linen collar and a dark four-in-hand tie are required along with the regulation uniform.

In connection with the Georgia School of Technology and the State Department of Vocational Education a foremanship course is given all supervisors and foremen. This course is offered to the men free of charge. but is not compulsory. The last classes, however, were attended by many men from the mechanical and roadway departments and the attendance from the division superintendents and supervisory force was 100 per cent.

Somewhat similar meetings are held by our safety director. At these meetings safety and courtesy are stressed. In an endeavor to reduce the number of accidents the trainmen have been divided into teams of about twenty men, and the team with the least number of accidents in each of the four divisions is given a banquet at the end of each month. There is also a banner that is kept in the headquarters of the division with the best accident record for the previous month.

The men are also privileged to wear the following emblems on their uniforms: A gold star to be worn on the collar presented for each five years of service; an embroidered "E," representing efficiency, to be worn on the left sleeve, given to conductors who maintain a certain record on Ohmer registers; a similar "E" for efficiency in power saving is awarded to all motormen and safety operators who maintain a predetermined record.

Realizing that all work and no play is a poor policy, while well, healthy and satisfied men are good employees, and better men to handle their work and the public, opportunities for pleasure and wholesome recreation and opportunities for providing against sickness, distress and old age are necessary. The company has the following organizations, all of which, except the annuity or pension plan, are maintained and controlled by the employees without cost to the company: Power club, social and athletic club, women's auxiliary of the transportation department, dental clinic, credit union, relief association and an annuity or pension plan.

FINANCIAL RETURNS ARE FAVORABLE

So far the financial returns from modernization have been favorable. There has been an increase in revenue, which we hope will continue to grow and expand as we more nearly meet present-day requirements. There has also been a decrease in operating expenses, which is due to having passed the peak of high maintenance by catching up with all the work that had been put off during past years.

The operating results for the first five months of 1926 compared with the same period of 1925 show that the total revenue has increased from 0.3799 cent to 0.3996 cent per car-mile. Operating expenses, in dollars, per car-mile have been as follows:

	1925	1926
Way and structures	0.0232	0.0211
Equipment	0.0220	0.0208
Power	0.0495	0.0495
Traffic	0.0004	0.0006
Conducting transportation	0.1355	0.1350
General and miscellaneous	0.0515	0.0545
Total	0.2821	0.2816
Net operating income	0.0978	*0.1180

*An increase of 20 per cent.

The fact brought out in ELECTRIC RAILWAY JOURNAL for July 3, that in the country at large only 802 new passenger cars were bought during the first half of 1926, is disconcerting. That article sounds a significant note of warning and deserves the careful consideration of all street railway executives. From our own experience I am convinced that new capital intelligently expended in modernizing a street railway property is a sound investment.

Service to newly developed residential districts of Atlanta is given by fifteen gas-electric buses

Complete substitution of cars of this type in place of older rolling stock in Huntington, W. Va., has materially reduced operating expenses of the Ohio Valley Electric Railway

Huntington SAVES FIFTY PER CENT

By complete replacement of old rolling stock the Ohio Valley Electric Railway has reduced operating and maintenance costs nearly 6 cents per car-mile during the past three years—Savings have been more than returned to public in increased service

By W. R. POWER

General Manager Ohio Valley Electric Railway
Huntington, W. Va.

After three years' experience with 100 per cent new passenger rolling stock in Huntington, W. Va., the Ohio Valley Electric Railway is maintaining this equipment for half the former cost. From an accompanying chart it can be seen that from 3 cents per car-mile in 1921 the costs have steadily declined to 1.266 cents in 1925. The jump to 1.55 cents for the first three months of 1926 is due to an abnormal condition that will disappear as the year advances. The decrease in the maintenance of the old cars in 1923 and to some extent in 1922 was in anticipation of the 40 new cars that were put in operation in January, 1924.

Not only in equipment maintenance was money saved, but in energy cost as well. An analysis of the energy consumption figures is necessary, however, to illustrate this point, since a change was made from coke heaters in the old cars to all electric heaters in the new. The cost has been materially increased thereby, and the energy consumed in the winter months has been just about offset by the saving due to the lighter weight cars. An analysis for the summer months of June, July, August and September for the years 1922 and 1923, before the new cars were started, and 1924 and 1925, after they were in operation, shows that the average energy consumption of the system was reduced from 3.41 kw.-hr. per car-mile to 2.7, making a saving of 0.64 kw.-hr. per car-mile, equaling 18.75 per cent. All energy is measured at the direct-current bus at the substations.

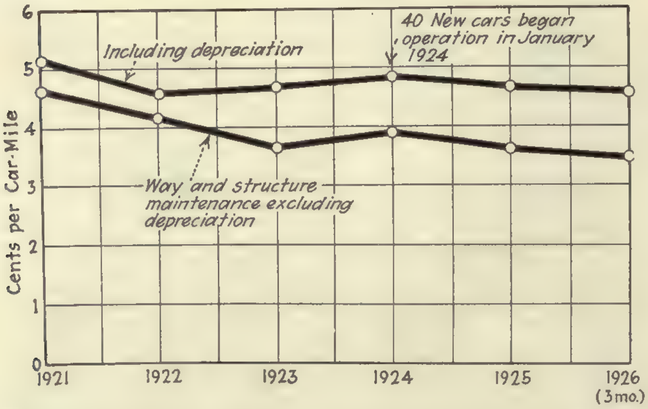
Track maintenance is effected only after a period of years. From an examination of the accompanying chart a decided tendency to fall off is observed from the high point of 4.64 cents per car-mile in 1921 to 3.616 in 1925 and 3.48 cents per car-mile for the first three months of 1926.

Conducting transportation, of course, reflects the change to one-man operation, except on the interurban line between Huntington and Ashland. Formerly all city cars required two men per car. Now about half of the operation is one-man, reducing the conducting transportation cost from about 12 cents per car-mile to 9.28 for the first three months of 1926.

As may be seen from the charts showing maintenance of track and equipment, the company policy relative to depreciation was changed. The amount set aside for renewals has been gradually increased to about $55,000 annually, or 2.59 cents per car-mile. This increase in depreciation reserve is shown as follows:

Depreciation by Years

	Cents per Car-Mile					
	1921	1922	1923	1924	1925	Threes Month 1926
Way and structures	.508	.432	1.014	.942	1.014	1.110
Equipment............	713	.542	.983	.942	1.304	1.480
Total depreciation....	1.221	.974	1.997	1.884	2.318	2.590



Way and structures expenses in cents per car-mile. The maintenance cost is shown separately to give the effect of increased depreciation charged during latter years

In analyzing the maintenance figures taken from the operating statements, it is only proper to segregate the depreciation because of the coincident increase in depreciation charges that were added in conformity to the changed policy of the company. The charts, therefore, have been made up to show the costs with and without this item.

Despite the low city fare of 6 cents, the company has returned more than the savings effected in increased service to the public after the new cars were brought on the property. Headways have been increased on all city lines and the same schedule on the interurban was maintained with ten of the new cars as against twelve of the old.

In all, the mileage operated has increased from 2,000,000 annually to 2,368,000 in 1925, an increase of 18.4 per cent. Patronage, however, has not followed suit. The company has been able to just about hold its own in riders, ranging in number from 13,000,000 to 14,900,000 annually. The increased mileage, however, has had a marked effect on the revenue per car-mile. These combined causes have reduced the net revenue earned from about 10.5 cents per mile to less than 8 cents.

Revenue, Operating Costs and Net by Years

	Cents per Car-Mile					
	1921	1922	1923	1924*	1925	Three Months 1926
Receipts per car-mile. . .	43.8	41.07	41.03	37.71	34.87	37.01
Operating Expenses:						
Way and structures . .	5.15	4.6	4.63	4.83	4.63	4.59
Equipment.	3 64	2.98	2.86	2.27	2.57	3.03
Power.	3.60	3.67	4.11	3.74	3.57	4.49
Conducting transportation.	13 17	11.93	11.90	10.85	9.54	9.28
Traffic.	.09	. . . . .	01	.01	.14	.01
General and miscellaneous	4.03	3.95	4.20	4.35	7.50	7.74
Total operating expenses per car-mile.	29.68	27.13	27.71	26.05	27.95	29.14
Net	14.12	13.94	13.32	11.66	6.92	7.87

	1921	1922	1923	1924	1925
Revenue passengers. . .	14,920,609	13,761,389	14,390,548	14,318,920	13,805,203
Passenger car-miles operated	1,958,566	2,004,798	2,098,207	2,271,589	2,368,160
Kw.-hr. per car-mile.	3.46	3.52	3.86	3.44	3.28

*Forty new cars purchased in January, 1924.

Maintenance Costs with Depreciation Segregated

	Cents per Car-Mile					
	1921	1922	1923	1924	1925	Three Months 1926
Way and structures:						
Maintenance	4.642	4.168	3.616	3.908	3.616	3.48
Depreciation	.508	.432	1.014	.942	1.014	1.11
Total way and structures.	5.150	4.600	4.630	4.850	4.630	4.59
Equipment:						
Maintenance	2.927	2.438	1.877	1.328	1.266	1.55
Depreciation	.713	.542	.983	.942	1.304	1.48
Total equipment. . . .	3.640	2.980	2.860	2.270	2.570	3 03

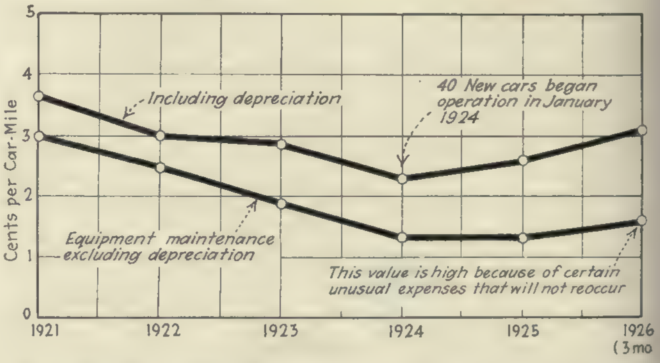
The population of Huntington has increased from 50,000 in 1920 to 80,000 at present and the city is in the transition stage between the small and large city. As population increases still further the transportation system will become more a basic necessity.

The 40 new cars put in service early in 1924 are 47 ft. in length, 8 ft. 4 in. wide over all and weigh 34,000 lb. They were built by the G. C. Kuhlman Car Company and are equipped with Brill 79-E trucks with four Westinghouse 510 35-hp. motors and K type control.

Seats are provided for 48 passengers and are constructed of wood. Contrary to many designs, the seats are spaced 33 in. apart and conform to the window spacing, thus giving plenty of room and good visibility. The floors are at one level from platform to platform, except for an imperceptible ramp at the ends. Entrance and exit can be made at the front end as the doors are 46 in. wide in the clear. However, the pay-enter inbound and pay-leave outbound system, about to be put in effect, will allow the use of the rear door when necessary to expedite loading and unloading in the downtown section. The rear door is under the control of the operator from a separate pneumatic valve. All doors must be closed before the line switch is made ready to operate, but otherwise full safety car equipment is not used.

Longitudinal seats at each end give wider aisle room and prevent excessive crowding when loading and unloading. Stanchions placed in front of the longitudinal seats eliminate the necessity of hand straps and have proved a popular substitution.

The 35-hp. motor equipment allows high acceleration rates and, with the wide streets in Huntington, permits the relatively high schedule speed of 10 m.p.h. for our city lines, including layover, and 13 m.p.h. from terminal to terminal on the interurban line between Huntington and Ashland.



Equipment maintenance costs in cents per car-mile. The increasing charges to depreciation apparently offset the true saving due to operation of the 40 new cars purchased in January, 1924. In 1925 and 1926 the maintenance charge is about equal to the depreciation

ROLLING STOCK IMPROVEMENT

saves a small interurban

Light-weight cars have reduced operating expenses 16.5 per cent on the Northampton Transit Company —Accidents have been greatly reduced

By W. O. HAY
General Manager
Northampton Transit Company
Easton, Pa.

New cars of this type have been the salvation of the Northampton Transit Company, operating an interurban electric railway through hilly country in the eastern part of Pennsylvania

DUE to ever-growing bus competition and increased use of privately owned automobiles, with their natural effect on the gross revenue of the Northampton Transit Company, our officers realized about four years ago that a reduction must be made in operating costs. It was thought this could best be obtained by the substitution of modern light-weight cars in place of the older equipment previously used. In April, 1923, we received six new one-man, two-man safety cars built by the Cincinnati Car Company. We were so pleased with these cars that we subsequently ordered two more, making a total of eight.

The new cars are 44 ft. 8 in. over all and weigh 30,000 lb. complete. Seats are provided for 52 passengers. Each car has four GE-265 motors. The old cars were equipped with GE-67 and Westinghouse 101-B motors, and with standard straight air brakes. Their weight was 45,000 lb. complete. This comparatively heavy weight was a serious disadvantage in the hilly country through which we operate, with grades as steep as 10 and 12 per cent.

	Cents per Car-Mile New Cars Year 1925	 Old Cars Year 1922
Way and structures......	5.8	7.0
Maintenance of equipment	0.6	0.7
Power..................	9.0	10.0
Conducting transportation	8.8 (*a*)	11.5 (*b*)
General and miscellaneous	2.3	2.5
Total................	26.5	31.7

(*a*) One-man. (*b*) Two-man.

With the new cars a reduction of 5.2 cents per car-mile has been made in operating expenses. This is subdivided as shown in the accompanying table.

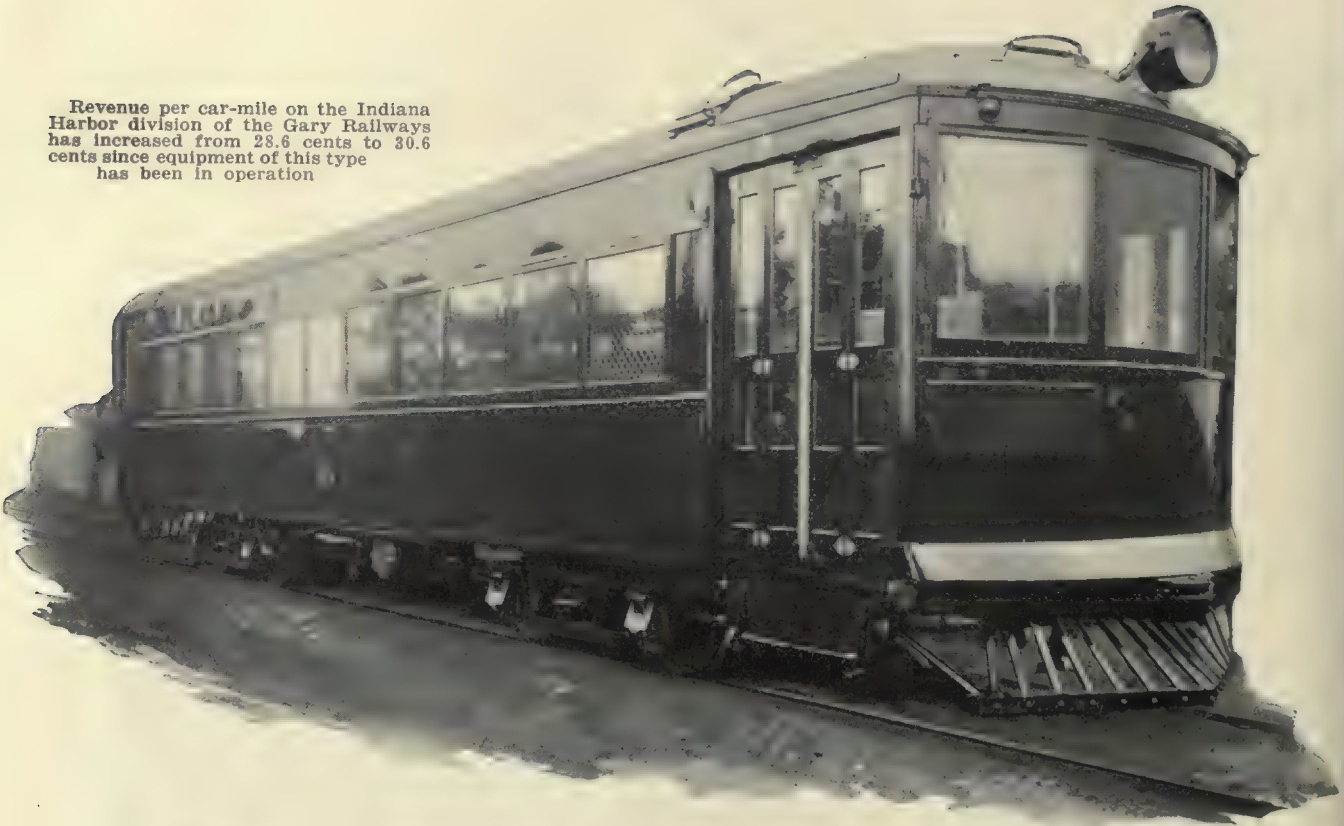
Substantial savings have been made in the power account. Economy meters to register the consumption of energy by each operator have been installed on all the new cars. Although we have an extremely hilly road, our men are averaging less than 2 kw. per car-mile.

One-man operation has replaced two-man operation over the entire road. Ohmer registers are used and fares are collected when the passenger boards the car for as many of the six zones as he may intend to ride.

We are just now beginning to feel the effect of the operation of light-weight cars on our maintenance of way costs. In replacing ties we are installing two new ties where three old ones were used. Our original spacing was on 2-ft. centers, but we find that with lighter equipment we no longer need ties spaced so closely.

During the three years we have been operating the new cars we have not had a single boarding and alighting accident, whereas these were of common occurrence while the old cars were in use. Trainmen much prefer the new cars.

We feel that if it had not been for the new equipment, which has greatly reduced operating costs, we would have had difficulty in making both ends meet, with the falling off in traffic due to automobile and bus.



Revenue per car-mile on the Indiana Harbor division of the Gary Railways has increased from 28.6 cents to 30.6 cents since equipment of this type has been in operation

LIGHT-WEIGHT CARS

pay well at Gary

By C. W. CHASE
President Gary Railways, Gary, Ind.

Gain in revenue on Indiana Harbor division amounts to nearly three times the interest requirements on the new equipment—Operating costs have been greatly reduced

IN A GREAT industrial community such as Gary, Ind., where from 8,000 to 10,000 working people must be transported between home and factory at three different periods of the day, the first requirements of street railway service are adequate equipment and convenient schedules. Back in 1918, before the popular mind had become so completely intrigued by the gasoline vehicle, the need for modern street cars, comfortable and attractive in design, were considered as all very well in their way. But as an inducement to riding their use was considered very little, if at all. This attitude prevailed in the old Gary Street Railway organization before the present management came into control. During the past eight years, however, this viewpoint has been entirely altered and in consequence the rolling stock has been thoroughly modernized.

Increasing costs of labor and materials, combined with the ever-growing menace of private automobile and bus competition shortly after the reorganization, began to offset the advantage the company enjoyed in serving one of the fastest-growing cities in the country. Under the attack of unrestricted jitney competition, the railway's traffic fell off and earnings, once highly satisfactory, showed a serious decline. The first attempt to remedy the situation was made in the summer of 1919, when eight one-man, single-truck, safety cars were placed in regular service over a 3-mile route on Broadway, the main business artery of Gary. The fifteen-minute headway previously provided on this line by heavy, two-man, double-truck cars of 1911 vintage was decreased to five minutes, and later to three. This improvement in service won the co-operation of city officials, and six months later an ordinance was voted to exclude all jitneys from the streets.

Which of the two factors—the more frequent service or the adoption of the light-weight equipment—had the greater effect in bringing about the increase in revenue which immediately followed the change could not be accurately determined. It is worth pointing out, however, that an operating expense of 31 cents a car-mile on this and other city lines of the company was reduced to an average of 28 cents by the substitution of the lighter, one-man cars.

A heavily losing 23-route-mile division between Gary and Valparaiso was the next objective in the company's modernization campaign. Serving a large summer population at inland lake resorts near Valparaiso, there were but two or three months of the year when this line was able to show a favorable operating ratio. For the better part of the year, earnings were hopelessly deficient. With the operation of the old-type, 55,000-lb., two-man cars, monthly revenue that amounted to

$11,099 in July, 1923, and to $7,100 in October of one year had fallen to $9,659 and $5,989, respectively, in the same months of the following year.

In November, 1924, the management replaced this obsolete, debt-incurring equipment with the same number of light-weight, one-man cars, attractive in design and weighing only 42,500 lb. each. The same hourly service and the same running time were maintained. Operating expenses per car-mile, which had averaged 28.4 cents for the last ten months of operation with two-man equipment, was straightway decreased to an average of 21.8 cents for the first ten months of one-man car operation. In the first 30 days of one-man operation the cost of conducting transportation was reduced from $1,400 to $984, or 29.7 per cent. Maintenance of equipment costs for corresponding periods likewise dropped from 2.13 cents per car-mile to 0.80 cent. The wage scale paid to operators of the new equipment was advanced to 71 cents an hour, or 5 cents more than motormen of the old two-man cars received.

Comfort and attractive appearance are believed by the present management to be prime requisites

In spite of a loss of some $1,800 a month in revenue from the transportation of milk, and the diversion of a large percentage of traffic between the two communities to the highways, particularly during the summer months, the year-around business on this line is picking up slowly. Revenue per car-mile is displaying even more encouraging tendencies. To protect this line and the Gary and Hobart division from independent bus competition, the company operates its own buses between Gary, Hobart and Valparaiso over highways closely paralleling the rails.

Effect of New Car Operation on Revenue and Costs of Valparaiso Division

Month	Total Revenue	Operating Expenses, Cents per Car-Mile
February, 1924	$5,870	35.1
July, 1924	9,659	28.8
October, 1924	5,989	27.6
November, 1924	5,936	19.5
February, 1925	6,432	22.3
July, 1925	8,283	22.0

Effect of New Car Operation on Revenue and Costs of Hobart Division

Month	Car-Miles	Total Revenue	Operating Expenses, Cents per Car-Mile
July, 1924	10,918	$4,110	31.2
August, 1924	10,918	4,024	35.1
July, 1925	11,338	4,483	..
August, 1925	16,644	5,083	26.0
July, 1926	16,402	5,450	....

Some ten months after the modern equipment remedy was first administered to the struggling Valparaiso division, a similar experiment was tried on the Gary and Hobart division in the form of three light-weight, double-truck, one-man cars of the same type. Unlike the thinly populated district traversed by the Valparaiso line, this division, some 7 miles in length, serves a fairly well developed suburban area. The old-style two-man cars, excessive in weight and unattractive in appearance, had been rendering a 90-minute service between Gary and Hobart, the latter a community of 5,000 inhabitants, at an average cost of 33.1 cents per car-mile. When one-man operation was initiated in August, 1925, the headway was reduced to 40 minutes, the resulting car mileage showing an increase of approximately 40 per cent. The average car-mile operating expense, at the same time, was lowered to 26.0 cents.

Perhaps the most impressive illustration of the value of modern light-weight equipment to the Gary Railways is that of the 10-mile interurban line from Gary to Indiana Harbor, on which three new double-truck, one-man, safety cars were put into operation just a few months ago. The territory lying between Gary and Indiana Harbor, the latter being a section of the city of East Chicago with a total population of 65,000, is singularly undeveloped, and on this account most of the revenue earned by this line comes from through and long-haul traffic. Paralleled for much of the distance by the famous Dunes Highway, this division was probably the hardest hit of all the company's lines by the bus competition which has become rife in this territory in recent years. At the present time two motor coach lines—one of them an allied company under the same Insull management as Gary Railways—are being operated in competition with the Indiana Harbor cars.

As a result of this intense rivalry for business and the phenomenal increase in private motor traffic, total revenue that in March, 1924, approached $13,000, had fallen in a little less than two years to a scant $7,000. The success which had attended its efforts to put new life into other divisions, however, led the company to decide last spring to do away with the antiquated 50,000-lb., two-man cars on the Indiana Harbor line, the continued operation of which augured nothing but constantly increasing losses.

An order for five new light-weight, double-end, one-man interurban cars, weighing but 37,000 lb. each and closely adhering in design and appointments to the type proposed in the recent report of the A.E.R.A. committee on essential features of modern cars, was subsequently placed with manufacturers well known for their successful construction of this type of rolling stock

Piping and other equipment on the front platform have been inclosed in a simple cabinet

The handsome new orange-colored cars, built at a cost of $16,800 each, were delivered on July 15 last and immediately assigned to service, three of them on the Indiana Harbor division and two on the Gary-Hobart line. No increase was made in headway.

The cars are equipped with every modern safety device, including line breakers, low 12-in. steps and specially constructed windows, green plush seats with linen-covered backs for 46 passengers, battleship linoleum floors, and attractive dome lighting fixtures. They have been in use for such a comparatively short time that complete operating figures are not yet available, but from studies that have already been made, there is every indication that traffic on both divisions will be greatly stimulated and many operating economies induced by their adoption.

Results noted in the brief period of their operation make it seem likely that over a full twelve-month period the savings in platform expense on the Indiana Harbor line alone will aggregate $1,500 a month. Reduced kilowatt-hour consumption will probably effect a power saving of another $800 monthly.

The average revenue per day earned by the new Indiana Harbor cars for the first 30 days of their operation was $204, as compared with the $191 earned in an average day by the old equipment during the 30-day period prior to its displacement. For the entire month of August, the average daily revenue had amounted to $215, or a gain in revenue amounting to nearly three times the interest requirements on the new cars. Revenue per car-mile operated for the 30 days preceding the change was 28.6 cents. This figure was increased in the first 30 days of operation with the light-weight rolling stock to 30.6 cents.

Experience thus far in the operation of this modern equipment sets to rest the old charge that one-man operation is dangerous. Since the inauguration of the service in July, the accident record of the new equipment is nearly 30 per cent better than that established by two-man cars on the Indiana Harbor division, there being seven accidents of all kinds on this line in the six weeks prior to one-man operation and only five in the six weeks immediately following their introduction. The ratio of cost of accidents to gross income, which in the four-year period from 1921 to 1925 has decreased from 4.49 per cent to 1.38 per cent, likewise testifies to the superior safety of one-man operation.

The greatly improved financial condition of Gary Railways at the present time is regarded by officials of the company as being due in large measure to the progressive application in the past seven years of these modern principles to the operation of its properties.

◆

Modern Interurban Cars Lower Costs

ON THE Springfield-Lima division of the Indiana, Columbus & Eastern Traction Company $19,000 a year is being saved through the operation of six light-weight interurban cars. This equipment was purchased three years ago for service on the unprofitable Dayton-Union City division. Despite a resultant substantial reduction in operating cost, it was decided to discontinue operation of the line at the end of last year. Management of the property is in the hands of J. H. McClure, receiver, and under the general direction of Day & Zimmermann, Inc. The new cars were designed by the latter organization and built by the G. C. Kuhlman Car Company. A description was published in ELECTRIC RAILWAY JOURNAL Dec. 1, 1923.

On Jan. 1, 1926, these six light-weight cars were transferred to the 66-mile division between Springfield and Lima. Energy consumption dropped from 4.3 kw.-hr. to 3.5 kw.-hr. per car-mile measured at the point of purchase. The cars by this time had worn off their newness and had reached a condition of normal maintenance. Costs, which had previously been 4.15 cents per car-mile for the heavy 40-ton steel and wood cars of the vintage of 1907-08, however, dropped to 2.01 cents per car-mile for the 25-ton all-steel cars.

Modern steel cars for Toronto's heavy traffic ranked before one of the new carhouses

Toronto finds

MODERNIZATION PROFITABLE

By D. W. HARVEY

General Manager Toronto Transportation Commission

MODERNIZATION of transportation service in Toronto started on Sept. 1, 1921. On that day practically all electric railway services within the city's limits were merged into one unified system, serving the entire area with one-fare transportation. Complete rehabilitation of the unified system and its extension to districts formerly unserved were started immediately. The result has been to establish safe, efficient and economical transportation service which has won the support and good will of the citizens in such measure that the success of the system is assured. This experience leads to only one conclusion — it pays to modernize.

Safe, efficient and economical transportation service has won the support and good-will of the public—575 new cars have been added in last 5 years and 490 old cars scrapped

The first step in modernization was the unification of all services operating within the city limits into one system. The single-track mileage of the lines amalgamated was:

	Miles
Toronto Railway	142
Toronto Civic Railway	22
Interurban lines	13
Total	177

Since the unification of these lines, rail extensions and addition of bus lines have brought the present mileage of the unified system to

Single-track miles of rail	227
Miles of bus routes	12
Total miles	239

Five bus lines, the first inaugurated in September, 1921, are operated as part of the universal fare system and serve districts which do not justify rail extensions. Cars and buses now serve the entire area of the city and travel to any point on the system requires payment of only one fare, free transfers for a continuous trip being issued between all electric and bus lines of the system.

Immediately following unification, rehabilitation was begun. This proceeded simultaneously in all departments. Track rehabilitation, rerouting of car lines, introduction of new types of cars, building new carhouses and shops, readjustment of stops, installation of automatic electric switches and other work progressed at the same time.

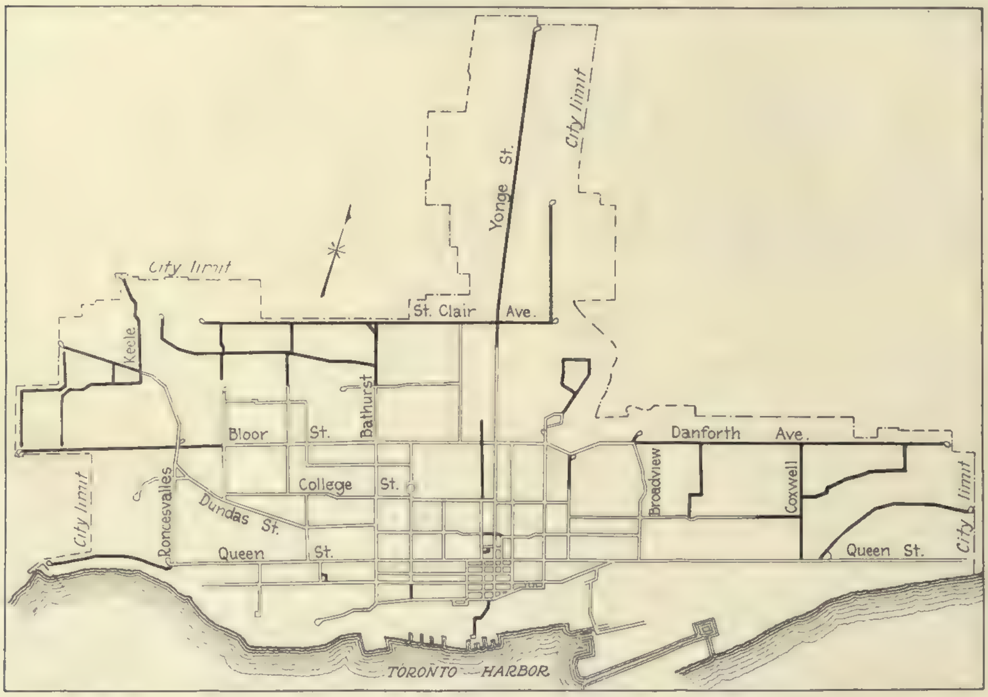
Due to the war and other conditions that contributed to the postponement of necessary repairs and renewals, the roadbed and track were in a bad state of repair. An extensive rehabilitation of the track was undertaken and was completed late in 1922. At the peak of the rehabilitation period 3,500 men were employed on track construction. A summary of the work done is given in the following table:

	Miles
Completely rehabilitated	57
New extensions	90
Double tracking	13
Loops constructed	31
Carhouse yards, reconstructed	3
Carhouse yards, new	4
Special track-work units, reconstructed	133
Special track-work units, new	339

New special trackwork laid during track rehabilitation was planned having in mind the complete rerouting of the unified system to make possible the provision of more convenient and efficient service. Included in the track program was the replacement of Y's with loops at practically all route terminals. Today there is only one Y on the whole system at a route terminus. The advantages in safety and efficiency of operation accruing from the use of loops have amply justified the cost of their construction. Similarly the 106 automatic electric switches installed have contributed in safety and efficiency at the busy intersections.

NEW CARS BOUGHT—OLD CARS SCRAPPED

Because they are so intimately associated with the personal comfort of the traveling public, the new cars which were placed in service late in 1921 carried a strong conviction that the transportation service was being thoroughly modernized. All new cars were painted red—a bright red with gold striping. It was decided that no longer would street cars slink along apologetically or unnoticed in nondescript colors. They do not make as much noise gliding smoothly along on the rehabilitated tracks as did the old cars on the old tracks, but they attract more attention—and, more important still, more passengers.



Extensions totaling 90 miles of track have been made during the past five years to the railway system in Toronto to meet the demands for its high-class modern transportation service

There are 350 of these cars now in service. They are of the Peter Witt front-entrance, pay-as-you-pass type, of steel construction, with pneumatic door controls, modern heating, lighting and ventilation and all details of modern design and equipment.

Obsolete single-truck trailers, many of them converted horse cars, with all the public prejudice they inspired as they bobbed along loosely coupled, were banished from Toronto in the modernization process. They were replaced with 225 new double-truck steel cars of the same type as the new motor cars, but with center entrance and exit. The three-door arrangement with convertible double-entrance, double-exit device was originated in this organization and applied on 165 of these cars with most satisfactory results in service. These cars also were painted bright red.

Something had to be done about the old cars on the system; 490 of them were scrapped. Of those retained, 215 cars of pay-as-you-enter type, wood and steel construction, were converted into front-entrance, pay-as-you-leave type, in which process they were completely remodeled and equipped to conform as near as possible to the standard of the new cars. They, too, as they re-entered service, were painted red. One hundred more of the old pay-as-you-enter cars were similarly modernized and remodeled into one-man "treadle" motor cars with front entrance and rear "treadle" exit door. Thirty-three of the old pay-as-you-enter cars were remodeled into "treadle" cars with front entrance and rear "treadle" exit—and red paint—for operation as the second car on six-motor two-car trains. With the completion of the remodeling of the former 348 pay-enter cars, every motor car on the system is a front-entrance type.

Emphasis has been placed on the red paint in telling of the modernizing of Toronto's rolling stock to call attention to two points —first, that people today like to ride in vehicles of smart appearance; and, second, that bright colors force them to notice that the cars are attractive in appearance. Those are the reasons why Toronto's street cars are painted bright red and kept bright and red. Incidentally, our experience indicates that brightly painted cars reduce the collision hazard.

The effect of the general modernization of the system is shown in the record of pull-ins of cars in service. During the past three years the car-miles per "pull-in" has trebled.

UP-TO-DATE SHOPS A NECESSITY

An adequate and efficient service cannot be operated without adequate and modern shops and facilities. The experience here is that the new shops effect savings sufficient to cover all carrying charges and to pay off the cost of the shops well within their economic lifetime. Our general shops were built on a site of 22.24 acres, formerly the Hillcrest racetrack, in the center of the territory served by the system. On this property are the general car shops, stores building, way department shops and materials yard, construction equipment sheds, buildings, maintenance shops, bus garage, overhead emergency garage, central heating plant, and general office building for the departments having headquarters at Hillcrest. All of the buildings are new and were designed for the purposes they now serve. They were first occupied in March, 1924. The buildings cover a ground area of 10.40 acres. Detailed descriptions of these shops have appeared in previous issues of the JOURNAL. More eloquent than a thorough description of the shops are the results they have helped to achieve.

Five of the seven divisional carhouses, situated in outlying districts of the city, are new and are, like the general shops, of most modern design and equipment. Approximately 25 per cent of the cars are stored under cover at the divisions.

The overhead, the substations, and all other branches of the system were also completely rehabilitated.

RESULTS SEEN IN BETTER SERVICE

The proving ground of all this modernizing of the system is in the service. Has the result been a more attractive service to the public?

Unification, extensions and new special trackwork combined to make possible a complete rerouting of the system. Main trunk lines extending across the city from eastern to western city limits, a distance of more than 10 miles, were established. In the past, passengers not only had to travel on two or three cars but also had to pay two or three fares. "Dipper," crosstown lines, originating in the northeast and northwest residential districts, crossing the city with a "dip" down into the central area of the city, were designed to give direct service for industrial, commercial, amusement and other traffic. North and south lines were established to intersect the crosstown lines at convenient intervals. Rerouting and a modern system gave a modern service, convenient and economical.

Some of the 490 cars which were scrapped during the work of modernizing the T. T. C. system

Significant Figures of Toronto's Transportation System

Cost of amalgamated properties	$15,374,122.19
Expenditure for rehabilitation and modernization	$29,222,639.44
Present fixed assets	$45,579,966.01
Area served, square miles	35
Population served	550,000
Miles of single track owned	227.40
Miles of bus routes	12.29
Passenger rolling stock—electric cars	984
Buses (not including motor coaches)	23
Miles operated per car per year	27,674
Revenue passengers per track-mile per year	794,986
Passenger car-miles per track-mile per year	108,431
Riding habit	333
Operating revenue per mile of track	$50,344
Operating income per mile of track	$17,877
Operating ratio, per cent	63.93
Average fare per revenue passenger, cents	6.16
Income from advertising, rental of equipment and other miscellaneous sources	$301,873.36

Rerouting time was an opportunity for readjusting stops. In some sections of the city the cars had been stopping almost at every post. The big new steel trains could scarcely get going between stops. Stops on each route were studied. Many were cut out and others were moved. The general average of stops was reduced from nine to seven to the mile.

With modern equipment correctly routed, and with unnecessary stops eliminated, another requirement of modern service was achieved—namely, speed. Schedule speed during rush hours has been increased over the system by 9 per cent to 9.43 m.p.h. and during normal hours by 7 per cent to 9.86 m.p.h.

NO MORE "PUSHERS IN"

Here is an interesting sidelight on the effect of modernization. Five years ago 75 uniformed men, politely called "groundmen," but more descriptively known as "pushers in," whose duties were to jam passengers into the cars and close the doors, were employed at heavy loading points during rush hours. Today no men are employed for this purpose, the modernized cars and service having eliminated conditions requiring high-pressure loading methods.

Of particular significance are figures showing the comparatively small miles per car per year as shown in the accompanying table. This is due to the extraordinarily acute peak traffic situation in Toronto. During normal hours the city is completely served with 300 cars on 27 regular routes, on none of which is the headway greater than six minutes, during the lightest hours of travel. During the morning rush hours 750 cars are operated, and at the peak of the evening rush 900 cars are in service. This peak traffic is due to the concentration of practically all of the downtown industrial, commercial and theatrical districts in an area of only 400 acres, with almost universal 9 to 5 business hours. Some 64 per cent of the daily riders are bound to or from or pass through these 400 acres. Out of this congested area the street cars carry 55,000 passengers every business day between 5 and 6 p.m.

The system owns 150 cars that make only one trip a day for five days of the week. The 5 o'clock peak is so acute that these cars do not have time to take a load to the outlying residential districts and return downtown for another load before the rush subsides.

A throat check, taken at the limits of the 400 acres, comprising the concentrated downtown area, indicates that there are 149 outbound passengers to every 100 seats available to them between 5 p.m. and 5:30 p.m., the maximum half-hour period. The modernization and increase in passenger equipment now provides 70 per cent more seating capacity for rush hours than was offered five years ago.

Traffic counts, taken on all streets—with and without car tracks—establish the fact that street cars carry 81 per cent of all persons transported into and out of the central business area.

Flattening of the "peak" is being studied and definite plans are in preparation to secure the co-operation of factories and business places in the adoption of staggered hours. A move made in this direction was the adoption in June last of staggered hours for all of the system's own shop, way and office employees. Publicity given to the commission's example has prompted others to follow suit without being requested to do so; however, an organized effort will be required before real results are obtained.

MOTOR COACH SERVICE INAUGURATED

While the modernization of the universal-fare transportation system was in progress, the organization kept in close touch with the development of special services which might be supplied. The motor coach presented a new field of service and revenue. We differentiate between the bus, as used in the universal-fare system, since September, 1921, and the motor coach, the more luxurious vehicle used in special services. The color line is drawn between the two classes of vehicle, the buses being of the bright red hue of the street cars, while the motor coaches are of a distinctive pyramid gray exterior.

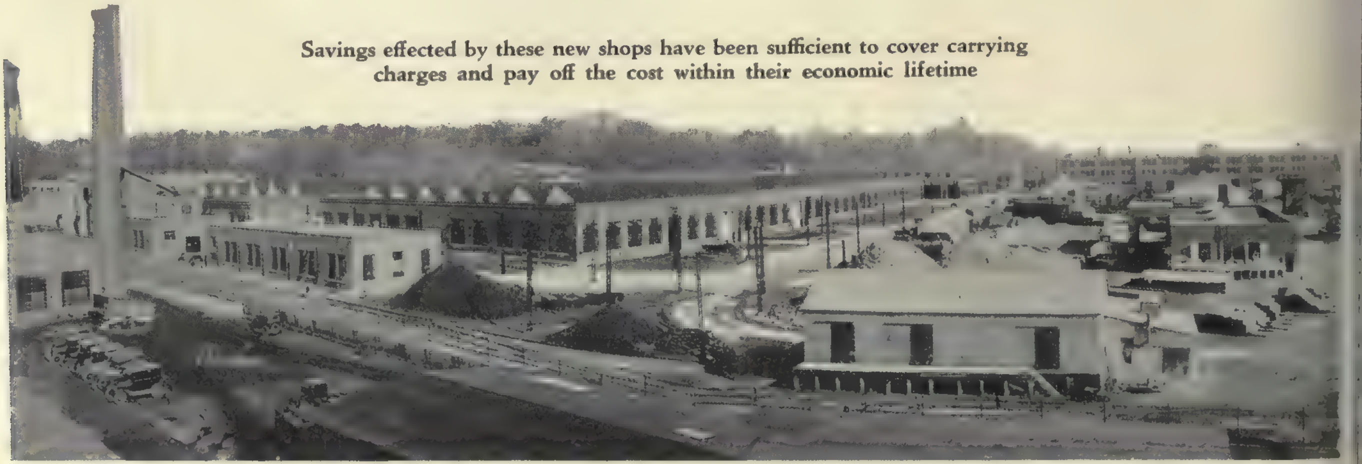
Investigation indicated that here, as elsewhere, the motor coach would win popular favor in the services to which it was adapted. Early in 1925 the first lot of fifteen motor coaches was ordered. Subsequent additions have brought the total of buses and coaches operated by the system to 75.

The motive in the adoption of motor coaches was to provide all forms of public transportation for which there was a demand that could be met and justified on economic grounds. The coaches have secured new revenue for the system. A policy which has governed the various motor coach services is that each must be self-sustaining. The variety of services operated makes possible a satisfactory year-round load factor for the coaches. Sightseeing tours, chartered trips, and long-distance excursions are operated, as well as regular scheduled service in the city.

MODERNIZATION SPREADS TO NEIGHBORING TOWNS

The modernization of Toronto's transportation system has had a marked effect on the municipalities immediately adjacent to the city. Several of these have employed the services of the system's traffic study department, which deals with matters that are a combination of traffic and engineering, to study their transportation needs and submit advisory reports. As a result of these relations 15.4 miles of electric railway lines are being operated by the Toronto system in two adjacent municipalities under special arrangements whereby the Toronto system operates the services at cost with its equipment on a rental basis.

Resulting from public appreciation of the modernization of the Toronto transportation system and its improved service, it has been accorded a most encouraging measure of public support and good will. A great factor in winning public favor to the system is the constantly safe, courteous and efficient performance of their duties by the trainmen, responding to their improved working conditions in the modernized cars and a natural pride in their association with the system.



Savings effected by these new shops have been sufficient to cover carrying charges and pay off the cost within their economic lifetime

The News of the Industry

New Ordinance Advanced in Kansas City

In accordance with a rule of the local City Council which provides that public utilities seeking a franchise with the city shall pay for copies to be distributed generally, it was agreed at a meeting of the Council of Kansas City, Mo., on Sept. 20 that 500 copies of the ordinance proposing an extension of twelve years of the present 33-year railway franchise will be printed and used for general distribution at the expense of the Kansas City Public Service Company, the new operating company seeking the extension. The present franchise has run for twelve years and the new company is seeking to restore the franchise to its original period of effectiveness.

It had been previously predicted that the final vote on the proposed ordinance would be taken by the Council at the meeting on Sept. 27, but it is now believed that the printing of the extra copies will prevent the ordinance from being voted upon finally at that time.

Councilman Gossett says that the proposed ordinance has provided the Council with something on which to build an acceptable plan and that the Council desires very much to arrive at a plan which will be fair to the public and to the new operating company.

Every effort will be made to bring the franchise ordinance to a point where it can be passed before the election in November, but it is thought improbable that this can be done.

The ordinance was returned to the committee without comment by the Council during the week ended Sept. 25, to be held for a second reading.

Key Route Rate Case Adjourned to January

After a brief hearing in Oakland Sept. 14, the California Railroad Commission adjourned the rate case of the Key System Transit Company until Jan. 11, to give the company an opportunity to permit completion of a physical inventory of its properties and a revaluation of its holdings.

The company is seeking to make permanent the temporary raise in rates granted last year as an emergency measure. The Railroad Commission increased the street car rates from 6 to 7 cents and ferry fares from 18 to 21 cents. There have been two adjournments granted of the hearing to fix permanent rates.

Witnesses for the company testified that following the rate increases patronage fell off more than was expected and that revenues did not show the increase that had been estimated. According to figures submitted by Richard Sachse, consulting engineer of the company, there has been a decrease of 4,300,000 in the number of passengers carried on street cars and ferries since the new fare schedule was put into effect.

Mr. Sachse and C. C. Vargas, assistant to President Miller, declared that since the new rates went into effect traction line revenues have increased $139,420 and ferry revenues $12 504 instead of the $750 000 anticipated The percentage of shrinkage in the number of passengers was set at 7.70.

H. P. Bell, chief engineer, declared that since Jan. 1 last a total of $6 000,000 has been expended by the company in improvements and that more improvements are contemplated. Investments made include, he stated, the purchase of 40 new cars at a total cost of $621,164; two new ferryboats, $1,752,994; the building of 12 steel center-entrance cars, $250,610, and the equipment of all Key cars with air brakes and electric couplers, $187,868.

In addition, it was pointed out, the company has been saddled with an extra expense of about $400,000, representing the cost to the company of an increase in wages which was awarded to the platform men.

Leon Gray, Oakland city attorney, assailed the company's figures, bringing out on cross-examination of witnesses that some of the proposed new construction cannot be undertaken within a year. He mentioned particularly the proposed overhead crossing at Emeryville and the extension of the Key mole.

Small Destruction of Florida Utilities

Cessation of Car Service in Miami While Rebuilding Work Begins—Loss on West Coast Slight Also—Buses Perform Valuable Service

INFORMATION coming to hand from Florida about the injury to utility property there indicates that the loss has been comparatively small. The facts are still fragmentary, because first of all attention is turned to rendering human succor. It appears, however, that the storm caused little damage that cannot be quickly repaired just as soon as men and materials in sufficient quantity are available. Tracks and overhead are gone here and there and buildings are demolished, but that appears to be the extent of the havoc. From Miami and its immediate environs, the area on the coast worst stricken, authentic reports on utility destruction are slow in coming in. So far as the magic city itself is concerned street car service had not been restored on Sept 22, but business was fast being resumed. It takes time to rebuild track and restore wires. Tampa and St. Petersburg, the two cities on the west coast of Florida having electric railway service, escaped Saturday's storm with comparatively light damage, officials declare. Shut-downs made necessary by broken circuits and damage to lines and poles constituted the discomforts of the storm to the railways of these cities.

Railway service in Tampa was discontinued at 10 o'clock Saturday night, when the wind reached a velocity of 52 miles an hour. At the same time about half of the cars in the city were moved to Tampa Heights from the carhouse, which is in a low section of the city, when it was feared water blown out of the harbor might return in the form of a tidal wave. This did not materialize, and by Sunday afternoon some of the cars were running. Service was normal Monday. Damage to Tampa Electric Company property, which included light and power, was not more than $15,000, officials say.

Service at St. Petersburg, which is under municipal management, was discontinued early Saturday evening, but cars were in operation in the city and on some suburban lines late Sunday. Service to Gulfport has not yet been completed because of a damaged bridge. Losses here were not great, and it was said that city service could have been continued but for the danger of short circuits from broken high-tension wires of the Pinellas Power Company.

A survey at Coral Gables indicates that the hurricane spent its force there to a lesser degree than in many other regions of the storm. The total property loss is put at about $1,500,000. The service on the local electric railway was interrupted by damage to overhead and track that can be repaired at small expense. Meanwhile, however, buses are covering the city on schedule.

Reports trickling in indicate that everywhere in the storm area buses performed valuable service. Many of the interurban bus services continued uninterrupted, but particularly in the Miami area was the bus requisitioned for emergency transportation. The Miami terminal of the Florida motor lines, a Stone & Webster organization, was damaged slightly. At Tampa there was very little damage to the company's property. No serious damage to buses was sustained by the Gulf Coast Transportation Company and the Tamiami Trail Tours. Weeks must intervene, however, before the facts can all be brought together from which the full story of the utilities in the storm area can be written.

Des Moines Men Lose Wage Claim

The claim of trainmen to $56,744 in back wages alleged to be due from the Des Moines City Railway, Des Moines, Ia., under an arbitration award made in 1920 was denied by the United States Circuit Court of Appeals in a decision handed down at Denver, Colo., on Sept. 20. The opinion was by Judge William S. Kenyon. It affirmed the ruling of Judge Martin J. Wade of the Federal District Court of Southern Iowa.

The litigation grew out of an arbitration award made by J. Edward Kirbye and J. Ben Wiley in April, 1920, allowing members of the Amalgamated Association a wage increase from 60 to 70 cents an hour. The award was to be retroactive to March 1, 1920, under a working agreement signed between the men and the company in 1915.

Payment of the full Kirbye scale of 70 cents was not made until after Aug. 1, 1920, the carmen being paid the old scale by order of the federal court upon representation of the receivers that revenues were insufficient to pay the new award.

On Aug. 21, 1920, the court ordered fares to be increased from 5 to 6 cents, and stipulated that the additional revenue should be used to pay the increase of 10 cents an hour provided in the Kirbye award, the rest, if any, was to be used to pay back wages of approximately $80,000, which had accrued since March 1. After $24,000 had been used for this purpose passenger traffic fell off to a point where there was no longer a balance.

The men then demanded payment of the remaining $56,744. The court refused to order payment and appeal was taken to the Circuit Court of Appeals.

In opposing the claims of the employees, the company contended that the Kirbye award was never accepted unconditionally by the court, but purely upon the basis that it would be paid if funds became available. The company also set up a counter claim against the union in the sum of $59,727. This amount it alleged was due the company from the men under the terms of a later wage arbitration in June, 1921. Under this award the arbitrators reduced the wage scale from 70 cents to 59 cents an hour. The company contended that this award should also have been retroactive to March 1, 1921, under the 1915 working agreement, and that the workmen should have been required to return the $59,727 overpaid to them.

Judge Scott M. Ladd, who represented the men in the appeal, said application for a rehearing may be made.

Writ to Stop Vote on Five-Cent Fare in New York Denied

The application of Frank J. McCabe for an injunction restraining the Board of Elections from submitting to the voters at the coming election the Municipal Assembly proposal for a referendum on the 5-cent fare was denied on Sept. 22 by Supreme Court Justice Valente. The decision was made almost entirely on the right of the Municipal Assembly to enact the law in question and the authority of the courts to interfere with the legislative branch of the government.

Former Comptroller Craig appeared as special counsel for the city, designated by Mayor Walker to act partly because he offered the resolution later enacted by the local legislature, and for the Tammany Hall law committee which appeared to aid in upholding the proposed referendum. The case will be appealed immediately.

The local law in question makes it unlawful for the Board of Estimate to authorize or effect any change in any rapid transit contract for the purpose of increasing the fare above 5 cents, or for granting any bonus or subsidy, or from considering such a proposal until after it has been submitted to the voters upon a referendum and has been approved by a majority, and such referendum cannot be submitted to the voters unless a petition has been filed signed by 15 per cent of the voters at the last state election.

The Appellate Division Justices may arrange to hear the appeal before their regular session on Oct. 5, but in any event the case will reach the Court of Appeals before the election on Nov. 2.

Rapid Transit Plan for Seattle to Go Before Council

William Pitt Trimble's plan for a rapid transit system for Seattle, Wash., will be laid formally before the City Council at a meeting, at which members of the Council will meet in committee of the whole with members of the Rapid Transit Club and the City Planning Commission for a general discussion of the plan. The transit committee has spent more than a year in research of urban traffic problems. The plan the committee agreed upon calls for construction of tunnel and trestles at an estimated cost of between $3,000,000 and $4,000,000.

COMING MEETINGS
OF
Electric Railway and Allied Associations

***Oct. 1*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p. m.**

***Oct. 1-2*—Public Utilities Association of West Virginia, annual convention, Kanawha Hotel, Charleston, W. Va.**

***Oct. 4-8*—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.**

***Oct. 10-15*—Congress International Tramway, Local Railway and Motorbus Association, Barcelona, Spain.**

***Oct. 25-29*—Annual Congress and Exhibit, National Safety Council, Book-Cadillac Hotel, Detroit, Mich.**

***Nov. 16-18*—Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.**

***November 16-19*—American Welding Society, fall meeting and International Welding and Cutting Exposition, Buffalo, New York.**

Rerouting in St. Louis Way to Traffic Improvement

The rerouting of several of the railway lines in St. Louis, Mo., including the merging of some and elimination of others, is being considered by Director of Streets and Sewers Brooks as a means of improving traffic conditions in the city. He plans to make all streets in the downtown section of the city one-way thoroughfares. The basic idea back of his tentative plans is to reduce the number of cars using the congested streets to a minimum, without incapacitating carriers in handling peak traffic, and straightening of lines, thus assuring quicker and better service. Some new tracks would be laid, but old tracks will remain for emergency use.

A Symposium of the Best Ideas in Railway Publicity and Advertising

From more than 5,000 advertisements and posters which have been used by electric railway companies in making contact with the public the American Electric Railway Association has selected 2,000 which it considers to be the best and possessing the strongest selling appeal. The 2,000 chosen have been assembled for presentation in a convenient looseleaf folder. Copies of this folder will be exhibited at the Cleveland convention and later each member company of the association will receive one of the books.

More than 200 pages of copy will appear in the folder at the outset and it is planned to add to these in the future as further examples of good railway publicity are received. The association thus assumes the rôle of a clearing house for publicity copy, passing on to the member companies outstanding contributions produced by individual railways or original material prepared by the association itself.

The contents of the folder will be arranged for use by member companies.

Minnesota Commission Makes Separate Appeal in Duluth Case

The Railroad and Warehouse Commission and the Attorney-General of Minnesota have joined in a separate appeal to the United States Supreme Court from a decree on fares in Duluth, granted to the Duluth Street Railway by the United States District Court in 1925. The city of Duluth had already appealed the case.

The commission and attorney general leaving all else to the separate appeal of the city of Duluth, have brought up for decision two claims:

1. That the district court of the United States for the district of Minnesota had no jurisdiction at the time this action was commenced; and

2. That, in any event, this action was prematurely brought and should have been dismissed.

The court also is asked to decide whether Chapter 278, Session Laws of Minnesota, 1921, offered by the Minnesota Legislature to appellee and others similarly situated and said to be accepted by the Duluth Street Railway as offered, is a binding agreement between Minnesota and the company.

Recent Bus Developments

Competitive Bus System Seeks Rights in Omaha

Petitions are being circulated in Omaha, Neb., asking for the submission of the question of granting a franchise to the bus interests headed by Russell J. Walsh, permitting them to operate within the city limits in competition with the Omaha & Council Bluffs Street Railway. It is considered unlikely that a sufficient number of signatures can be secured in time to file the petitions so that the voters may pass on the question at the November election. This means no action until next May.

The Council has been enjoined by the railway from granting permits for the operation of competing buses. The company contended that a franchise was necessary and that there should be a vote of the people first. The Supreme Court took the contrary position and the injunction was dissolved. Before the mandate of the higher court reached the City Council, the Guaranty Trust Company, New York, representing the bondholders, invoked the injunctive powers of the federal court, on similar grounds, and this tied the Council's hands.

Mr. Walsh proposes to obviate the necessity of litigation by conceding that a vote of the people is required, and so will ask for one. Meanwhile the railway is adding buses in newly developed portions of the city.

Bus Lines Out of Buffalo Sanctioned

The Public Service Commission has approved a declaration of abandonment by the International Railway, Buffalo, N. Y., of that portion of its route known as its Buffalo, Kenmore and Tonawanda line and that portion of its route known as its Military Road line in the villages of Kenmore, the town of Tonawanda and the city of Tonawanda. In the commission's order the railway is required to protect the rights of holders of bonds issued under an indenture of mortgage dated May 25, 1898, by depositing with the trustee of the mortgage $2.500 semi-annually until ten payments have been made.

The Public Service Commission has granted to the International Bus Corporation, a subsidiary of the International Railway, permission for the operation of bus lines from the city of Tonawanda to the Buffalo city line and between Kenmore and Tonawanda.

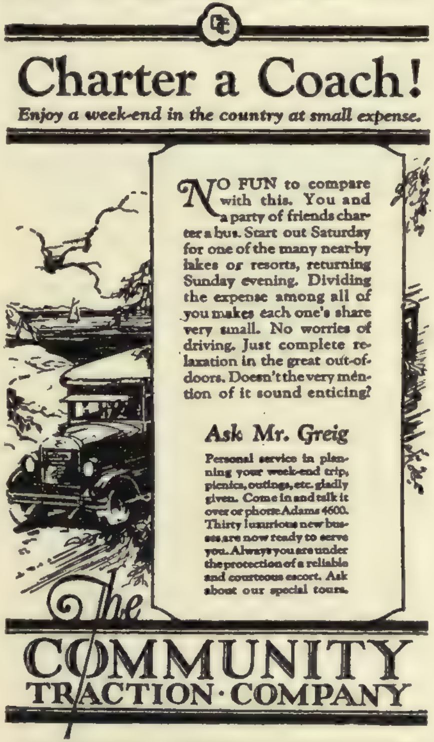
Fight Likely Over New York Bus Grant

According to the *Wall Street Journal* there is likely to be a split in the Board of Estimate on the granting of bus franchises in New York City and although it may be that Mayor Walker favors the Equitable Coach Company's application it is by no means a certainty that it will be the successful applicant. That paper said:

> The sponsors of the Equitable Coach Company have kept as much as possible in the background. But it is generally understood that its backers include the engineering firm of J. G. White, William H. Woodin, president of American Car & Foundry Company and vice-chairman of the Mayor's Committee on Reception of Distinguished Guests, and Grover A. Whalen, acting chairman of the Mayor's Committee on Reception of Distinguished Guests, general manager of the Wanamaker stores and formerly Commissioner of Plant and Structures under former Mayor Hylan. At present the Equitable is operating a line of buses between the Wanamaker stores of New York and Philadelphia. Presumably if the company is successful in securing city-wide franchises it will be operated and managed by the J. G. White Company.

Bus Service Under Charter Plan at Toledo

The Community Traction Company, Toledo, Ohio, has entered the field of furnishing private bus service under charter arrangements to parties traveling to conventions, parties and outings. An announcement has been made through a regular display space newspaper advertising campaign in Toledo newspapers. James Ashton Greig is in charge of the new business. Already he has had a number of inquiries and believes that a profitable sideline business may be developed through the chartering of buses.



Charter a Coach!

Enjoy a week-end in the country at small expense.

NO FUN to compare with this. You and a party of friends charter a bus. Start out Saturday for one of the many near-by lakes or resorts, returning Sunday evening. Dividing the expense among all of you makes each one's share very small. No worries of driving. Just complete relaxation in the great out-of-doors. Doesn't the very mention of it sound enticing?

Ask Mr. Greig

Personal service in planning your week-end trip, picnics, outings, etc. gladly given. Come in and talk it over or phone Adams 4600. Thirty luxurious new buses are now ready to serve you. Always you are under the protection of a reliable and courteous escort. Ask about our special tours.

The COMMUNITY TRACTION·COMPANY

The Company's Message to Week-Enders

The company recently placed a fleet of buses in operation on its Front Street route, from which tracks were removed during repaving of the street. Several feeder lines are also in operation and the company has lately taken over this business itself, doing away with the old plan of farming it out.

Competitor Denied Rights in Milwaukee

Downtown Milwaukee from Grand Avenue and Sixth Street east to the North Western depot is adequately served by the railway and bus lines of the Milwaukee Electric Railway & Light Company, and another transportation line would only add to the city's growing traffic congestion problem, according to the Wisconsin Railroad Commission. So that body has denied the application of the American Bus Lines, Inc., for a permit to extend its service from its Sixth Street terminal east to the North Western depot at the lake. The city opposed the extension on the ground that it would increase traffic difficulties and it also asked that no further certificates be granted for the downtown streets pending completion of the transportation survey.

The commission declared that the city's attempt to avoid further congestion on Grand Avenue did not seem unreasonable. It held that a question of this kind is primarily of local concern and that where there is a difference of opinion between a bus company and a city over the route of interurban buses over city streets weight will be given by the Railroad Commission to the recommendations of a city.

Buses Between Lincoln and University Place

The Omaha, Lincoln & Beatrice Railway has been authorized by the Nebraska State Railway Commission to operate a bus service between the city of Lincoln and University Place, a college suburb of 5,000 population, that is shortly to become a part of the municipality. The bus line will compete for business with the Lincoln Traction Company for traffic between the State Agricultural College and the city as well as in a downtown business district loop. Three buses are to be purchased and a 10-cent fare is to be charged as against a 7-cent fare on the interurban.

The permission is granted upon the condition that the tracks in University Place, which city has been served by a spur from the main line to Bethany, another college suburb, are to remain in place until further action by the commission; that the electric service be continued until the bus service is started, and that approval be secured from the commission of the type of buses to be used.

Buses Withdrawn from Downtown Area.—The Louisville Railway, Louisville, Ky., under a new grant, has started combination bus and street car rides, with bus fares 10 cents, including transfers, and street car fares unchanged at 7 cents. Transfers can be made from bus to car or from car to bus, as desired, but a transfer and 3 cents in cash are needed upon entering the bus. Under the new contract the company is withdrawing its buses from routes which run to the downtown section of the city, and the buses will only be used for feeders to the car lines, operating from the terminals, through residence sections which have sprung up since any new car lines have been built.

Financial and Corporate

Georgia Utilities Consolidation in Prospect

Following the filing of a petition for charter of the Georgia Power Company P. S. Arkwright, president of the Georgia Railway & Power Company, Atlanta, Ga., has announced that the purpose of the new company is to consolidate into one company such of the various electric light, power, street railway and gas companies in Georgia the stock of which has been acquired by the Southeastern Power & Light Company. The Georgia Power Company eventually will own and operate these various properties instead of having numerous separate companies as at present. The properties include, among others, the Georgia Railway & Power Company, Georgia Railway & Electric Company, Athens Railway & Electric Company, Rome Railway & Electric Company, Georgia Utilities Company, Macon Railway & Electric Company, and several other separate corporations, all controlled by the Southeastern Power & Light Company.

This consolidation of the various companies under one company will greatly simplify the situation, aid in financing the enterprise and result in a unification under one company of the various operations. The new company will be a Georgia company, incorporated under the laws of the state, controlled and managed as provided by the Georgia laws, with a board of directors, the majority of whom will be residents of the state of Georgia, and will be subject to the regulations of the Georgia Public Service Commission.

P. S. Arkwright is to be president and H. M. Atkinson is to be chairman of the board of directors. Other officers have not been announced.

D. & H. May Segregate Traction Holdings

Segregation of all the subsidiaries of the Delaware & Hudson Company is forecast in an official notice to stockholders of a special meeting to be held in New York on Oct. 26. It is stated that there will be presented for action at that meeting a recommendation of the board of managers that authority be conferred on that body "to transfer to a corporation or corporations, all the stock of which shall be owned by the Delaware & Hudson Company, all or any of the railroad properties, boat lines, traction lines, motor bus lines, hotels and other analogous interests belonging to it. . . ."

The principal traction lines owned by the D. & H. are the United Traction Company, Albany, N. Y.; Hudson Valley Railway, Glens Falls, N. Y., and the Troy & New England Railway, Troy, N. Y. The D. & H. also controls the Schenectady Railway jointly with the New York Central.

Conspectus of Indexes for September, 1926

Compiled for Publication in This Paper by
ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Sept. 1926 7.36	Aug. 1926 7.36	Sept. 1925 7.29	June 1926 7.37	May 1923 6.88
Electric Railway Materials* 1913 = 100	Sept. 1926 154.2	Aug. 1926 153.1	Sept. 1925 150.9	Sept. 1920 247.5	Oct. 1924 148.5
Electric Railway Wages* 1913 = 100	Sept. 1926 226.1	Aug 1926 225.9	Sept. 1925 222.7	Sept. 1920 232.0	March 1923 206.8
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Sept. 1926 203.2	Aug. 1926 203.6	Sept. 1925 200.5	July 1920 256.4	May 1922 167.4
Eng. News-Record Construction Cost (General) 1913 = 100	Sept. 1926 208.3	Aug. 1926 208.3	Sept. 1925 202.1	June 1920 273.8	Mar. 1922 162.0
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Aug. 1926 149.2	July 1926 150.7	Aug. 1925 160.4	May 1920 246.7	Jan. 1922 138.3
Bradstreet Wholesale Commodities 1913 = 9.21	Sept. 1 1926 12.70	Aug. 1 1926 12.64	Sept. 1 1925 14.09	Feb. 1 1920 20.87	June 1 1921 10.62
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Aug. 1926 155.7	July 1926 157.0	Aug. 1925 160.4	July 1920 219.2	Mar. 1922 138.7
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Aug 1926 165.3	July 1926 166.0	Aug. 1925 168.7	July 1920 204.5	Aug. 1922 154.5
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Aug. 31 1926 3.542	July 31 1926 3.693	Aug. 31 1925 3.513	July 31 1920 11.118	July 31 1924 3.187
Bank Clearings Outside N. Y. City (Billions)	Aug. 1926 17.47	July 1926 19.18	Aug. 1925 17.05	Oct. 1925 20.47	Feb. 1922 10.65
Business Failures Number Liabilities (Millions)	Aug 1926 1516 39.77	July 1926 1661 89.86	Aug. 1925 1353 27.22	Jan. 1924 2231 122.95	Aug. 1925 1353 27.22

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Milwaukee Company Heads Tax List in Wisconsin.—The Milwaukee Electric Railway & Light Company heads the list of utilities in Wisconsin with an assessment of $85,000,000 this year, compared with $74,750,000 last year. It will pay a tax of $1,897,691, compared with $1,571,561 in 1925.

Three Representatives Renominated.—The Transit Commission renominated recently Alfred E. Marling, Robert A. Shaw and Benjamin H. Namm as representatives of the public on the board of directors of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., for another year. Their present terms expire this month.

New Directors in Nashville.—Berry S. Spain, assistant secretary and assistant treasurer of the Nashville Railway & Light Company, Nashville, Tenn., was elected a director of that company recently when the board of directors held a called meeting in the local office of President B. C. Edgar. John Conn Guild, vice-president of the Tennessee Electric Power Company, was also named on the board. The two new directors succeed H. A. Batchelor and W. R. Cole, resigned.

Consider Babylon Car Purchase.—Conferences are being held in Babylon. L. I., with a view to the purchase of the long defunct Babylon Railroad line which skirted the Long Island Railroad tracks through a large portion of the town. The village board has appointed a committee to confer with representatives of the company. The offer made to the town officials precludes the building of a new highway which would emerge at Lindenhurst. The trolley line owns a right-of-way extending 30 ft. in width to the western village limits. The entire length of the proposed roadway is about 3 miles.

Earnings Improve.—The gross earnings of the Interstate Street Railway, Attleboro, Mass., for the year ended July 31, 1926, were $177,225, compared with $171,333 for a similar period in 1925. The operating expenses, depreciation and interest fell off from $187,649 in 1925 to $136,786 in 1926. The balance, after the consideration of taxes, was $33,139, against a deficit in 1925 of $24,025.

Record of Passengers Carried Shows Gain.—For July, 1926, the number of passengers carried on the lines of the United Railways & Electric Company, Baltimore, Md., was 17,849,930, against 17,863,722 in July, 1925, according to a statement of the Industrial Bureau of the Baltimore Association of Commerce. For the seven months period ended July 31. 1926, the total number of passengers carried was 131,565,184, compared with 130,624,785 for the similar seven months period of a year ago.

Net Income Increases.—For the two months period ended Aug. 31, 1926, the total operating revenues of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., were $8,002,457 against $7,638,705 for a similar period of 1925. Total operating expenses were $5,033,994 against $4,990,791 for the 1925 period. The net income after the consideration of income deductions was $1,246,569 compared with $1,008,175 in 1925.

Personal Items

Berlin Traffic Expert Studies American Street Conditions

Dr. Leonhard Adler, member of the City Council and Commissioner of local traffic in Berlin, Germany, has been making a tour of a number of the principal cities of this country. The Berlin municipality, through stock ownership, controls the company operating all the street railways in Berlin, and it has recently also taken over the bus, elevated and subway services. The problem of the co-ordination of these services so as best to provide for the local traffic needs of Berlin has therefore become a very active problem in that city. It was largely to study American methods along this line that Dr. Adler came to the United States. During his trip he visited New York, Detroit, Chicago, Washington and Philadelphia, among other cities, and declared shortly before sailing on Sept. 21 that his visit had been very helpful on his problems.

In one important respect, he said, traffic conditions in Berlin differ from those in this country. There is nowhere near the number of private automobiles on the streets. The total registration or private automobiles in Berlin is only about 48,000, although the city has a population approximating 3,000,000. This difference can be explained by the higher first cost and higher operating expenses of cars in Germany, as well as by the lower average incomes of its inhabitants. Thus, while in the United States a new automobile of good make can be purchased by a workman for a price equivalent to about two month's wages, it would take a German workman two years to earn the price of a corresponding car. Gasoline retails for about 45 cents a gallon in Germany.

Dr. Adler said that while a number of buses were in use in Berlin, the street cars were being depended on to carry the bulk of the traffic. He thought this condition would continue on account of the much lower operating cost per passenger by the cars. Among recent developments on the street railway system Dr. Adler spoke of the new light-weight cars, described on page 285 of the issue of this paper for Feb. 13, 1926; also of recent carhouse construction in which the carhouse is in the center of a block and apartment buildings for the train service men on the street frontage. This is a great convenience to them and a help to the company.

Former Railway Man With Mack Trucks

William Whiteford, once vice-president and manager of the Twin City Rapid Transit Company, resigned to go into the truck business, is not to be lost entirely to transportation service, as he has been appointed manager of the northwest branch of the Mack Truck Company, which is erecting a headquarters building at University and Cromwell Avenues, St. Paul, Minn. The district is Minnesota, the Dakotas, Iowa, Nebraska, Montana, Wyoming and Colorado. Mr. Whiteford succeeds Thomas F. Egan.

R. L. Horsfield, general manager of the Cardiff Corporation Tramways, has been appointed president of the Municipal Tramways Association (Great Britain). Alderman J. Bowes, chairman of the Manchester Tramways Committee, has become vice-president.

C. E. Thorney, who has occupied the post for the last year as general agent of the Chicago, North Shore & Milwaukee Railroad, with headquarters at Milwaukee, Wis., has been promoted to general agent of the entire North Shore railway and bus systems. He left Milwaukee on Sept. 15 to take over his new duties at Chicago. Mr. Thorney went to Milwaukee as division passenger agent and later was promoted to general agent of the North Shore lines in Wisconsin.

R. S. Amis, general agent of the Chicago, North Shore & Milwaukee Railroad at Chicago, Ill., has been appointed successor to C. E. Thorney as general agent of the properties at Milwaukee.

Phil Litman, who has been in charge of the activities of the Wisconsin Motor Coach Association, as executive manager, has resigned from that post to enter the bus business in Davenport, Iowa. Mr. Litman was the first secretary of the association.

R. O. Quick has been appointed director of public relations of the Wisconsin Power & Light Company, Oshkosh, Wis., succeeding A. P. Gale, who was made manager recently of the Beloit properties of the company.

Ray K. Linsley, office manager of the Bristol & Plainville Electric Company, Bristol, Conn., has been transfered to the general offices of the Connecticut Light & Power Company at Hartford. Mr. Linsley has been connected with the Bristol company for 27 years. He joined the organization when it was the Bristol & Plainville Tramway.

Obituary

C. R. Huntley

Charles R. Huntley, a director of the International Railway, Buffalo, and president of the Buffalo General Electric Company, died on Sept. 17 after an illness of several months. He was 73 years old. Mr. Huntley also was a director of the General Railway Signal Company, Rochester, the Niagara Electric Service Corporation, Niagara Falls, and chairman of the board of the Buffalo, Niagara & Eastern Power Company, Buffalo.

Mr. Huntley started his business career as a clerk in his father's store in West Winfield, N. Y., but perhaps the most colorful periods of his life was spent in the Pennsylvania oil fields where he started as bookkeeper. Later he became an agent for a pipe line company and finally went into the oil exchange as a broker.

In 1889, when the electrical business was in its infancy, Mr. Huntley went to work for the old Brush Electric Company, Buffalo. Later he was made general manager and in 1892 the Brush company was merged with the Buffalo General Electric Company, and he became its first vice-president. He continued in this capacity until the death of Daniel O'Day in 1906 when he was elected president to succeed Mr. O'Day. He was a member of the executive committee of the Pan-American Exposition in Buffalo in 1901. He was a past-president of the National Electric Light Association and a member of numerous scientific and business organizations.

J. E. Allison

James E. Allison, for the last ten years head of James E. Allison & Company, St. Louis, Mo., consulting engineers, and former member of the now defunct St. Louis, Mo., Public Service Commission, died in St. Louis, Mo., on Sept. 19 at the age of 61 years.

In recent years Mr. Allison specialized as a valuation engineer. He served in that capacity on frequent occasions for the Interstate Commerce Commission and various state commissions and also represented public utility companies and municipalities in cases before state commissions.

Mr. Allison went to St. Louis prior to the opening of the Louisiana Purchase Exposition in 1904 as a civil and mechanical engineer. Upon the basis of his work for the world's fair he was later appointed to the city's public service commission by Mayor Wells and served in that capacity under Mayor Kreisman and in the first term of Mayor Kiel, when the commission was abolished.

He was born in Xenia, Ohio. He was graduated from Harvard University.

Robert Jemison, at one time the president of the Birmingham Railway Light & Power Company, Birmingham, Ala., died recently. Mr. Jemison was known not only as a railway promoter but he was a conspicuous figure in all industrial activities. He was recognized as one of the men who accomplished most for Birmingham. Besides being first among the pioneer real estate men of the city and one of the organizers of the original Birmingham Electric Company, he helped to consolidate various railways of the city. For twenty years he was connected in an official capacity with the electric railway system of Birmingham. He resigned the presidency in 1907 after six years in that position to become chairman of the executive board. The new position gave him greater powers but relieved him of the active duties of directing the local system. Mr. Jemison was born in Tuscaloosa 73 years ago. He was graduated from the University of Alabama. After his retirement from the railway he spent most of his time in travel and in philanthropic work.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Fewer Ties But More Poles Purchased in 1925

Data have been collected by the Department of Commerce in co-operation with the Department of Agriculture, to show the relative purchases of wood ties by electric and steam railways in 1925 and in 1923. Information has also been gathered on the relative purchases of wooden poles by railways, light and power companies and commercial telegraph and telephone companies for those two years.

In 1923 6,842,770 wooden ties of all classes were purchased by electric railways. Preliminary figures for 1925 give the total for that year as 6,187,959, a material decrease over the former period. Of the total for 1925, 1,174,312 were treated ties and the balance untreated. The largest number of any one class of untreated ties purchased were 1,558,129 heart white oaks, a wood which may readily be used untreated. Red oak ties to the number of 423,052 were reported as sold after treatment, in 1925. Figures are not available to show the relative number of treated and untreated ties sold in 1923 as no attempt was made to differentiate between them at that time.

An increase was shown for 1925 over 1923 in the matter of wooden poles purchased. The total last year was 3,291,514, while that for 1923 was 3,060,794. A majority of poles purchased in 1925 were treated, these totaling 1,768,522, while the untreated poles totaled 1,512,992. The two principal types of wood specified in 1925 were Western red cedar and Southern red cedar.

Tire Executives Comment on Rubber Situation

Bottom prices have been reached in the crude rubber market and stability of prices is assured for an indefinite period, according to the opinion of Harry T. Dunn, president of the Fisk Tire Company, who has just returned from England, where he has made a study of the rubber situation. He went on to say:

> First-hand contact with the English rubber market gives every basis for the belief that crude rubber prices have settled down to a stable price level, and I believe that every legitimate effort will be made by the planters to insure quiet, steady markets.

William O'Neil, president of the General Tire & Rubber Company, does not entirely subscribe to this optimistic forecast. He inclines more to the belief that a certain amount of fluctuation in the price of crude rubber will continue to make itself felt for some time to come. He stated that in his opinion good tires are cheaper now than they are apt to be again in the near future.

Commenting on a recent statement of the Secretary of Commerce, who attributes present rubber prices to a "rubber conservation campaign of manufacturers and consumers," Mr. O'Neil said:

> It it still true that you can't save rubber by using less of it. The consumer has not been helped by the tire manufacturer, who has taken to using more substitutes for real, new rubber in the last few months. What tire users want is mileage, and the net result of the increase in the use of shoddy, second-hand rubber and other substitutes in tires has been to lessen the wear of such tires. So the consumer, to obtain a stated number of miles from "substituted tires," must actually pay more per mile instead of less if he uses such products.

Metal, Coal and Material Prices

Metals—New York	Sept. 21, 1926
Copper, electrolytic, cents per lb.	14.275
Copper wire, cents per lb.	16.25
Lead, cents per lb.	8.75
Zinc, cents per lb.	7.77
Tin, Straits, cents per lb.	70.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.55
Somerset mine run, Boston, net tons	1.95
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.525
Central, Ill., screenings, Chicago, net tons	1.40
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.00
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.60
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.25
Turpentine (bbl. lots), N. Y., per gal.	$0.92

Transportation and Utility Earnings Above the Average

Transportation and public utility companies are rated somewhat higher than industry in general in the percentage of gross income applied to annual cash dividends, according to an analysis of corporate finances recently made by the National Industrial Conference Board, New York, N. Y. An average of only 3½ cents out of every $1 of gross receipts annually of all the corporations in the United States is applied to cash dividends, even in good years, it was stated. Cash dividends in 1923, the latest representative good year for which data are available, range from an average of 7 per cent of total receipts among corporations engaged in financial operations, such as banks, insurance companies and the like, to as low as an average of 1.2 per cent of total receipts in wholesale and retail trade. In the same year transportation and public utility companies disbursed 6.3 per cent of their gross receipts as cash dividends, while the manufacturing companies' total cash dividends were 3.6 per cent of their total receipts.

The total amount set aside in 1923 for improvement, expansion, making up previous losses and other capital reserves represented little more than 2 per cent of the total receipts of all corporations, and 2.6 per cent was charged to depreciation. This 2 per cent of gross receipts not disbursed in cash dividends also covered the item of stock dividends which loomed so large in creating a popular impression of great prosperity in the case of a few individual companies. But the relative importance of such surplus earnings, as regards the business of the nation as a whole, in the light of the Conference Board's analysis, obviously is very small, being only a fractional portion of 2 per cent of the total receipts.

By far the greatest portion of the gross income, 86.8 per cent, or nearly nine-tenths of the total receipts of all corporations in 1923, went into operating expenses, covering wages, cost of material, fuel, power and supplies, officers' salaries and similar items.

Irving Iron Works Holds Annual Sales Convention

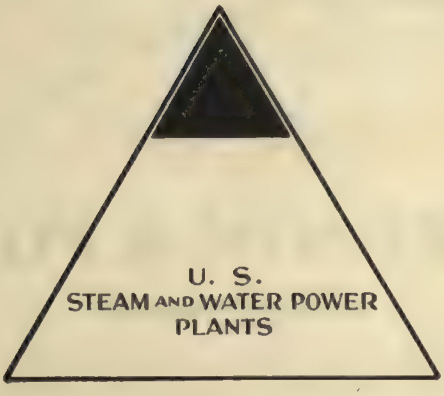
More than a hundred members of the Irving Iron Works organization were present at the national sales convention of the company, which has been in session at the Hotel Astor in New York City during the past week. The attendance included officers of the company, department heads from the main office and factory at Long Island City and representatives from the 30 sales offices throughout the country.

The opening session, held on the morning of Tuesday, Sept. 21, was followed by an inspection of the factory and a baseball game between teams from the office and shop forces. A buffet supper at the plant and an evening business meeting completed the day. On Wednesday, after a morning business session and luncheon, the party traveled to Kearny, N. J., to inspect a notable installation of Irving "subway" flooring and "Safsteps" in the power plant of the Public Service Production Corporation. Returning to New York, the day closed with a banquet, presided over by Walter E. Irving, president of the company.

Thursday was given over entirely to a discussion of sales promotion and departmental co-operation. On Friday business was cast aside and the party was conveyed by private cars to Stamford, Conn., and entertained with a clambake and outdoor games at Mr. Irving's country place, Glenbrook.

Track and Line

Manhattan & Queens Traction Company, New York, N. Y., plans to relocate the trolley tracks on Queens Boulevard from Jamaica to New York and the Eastern Construction Company, Brooklyn, the lowest bidder, has notified the Borough President that it is ready to start the work immediately upon the awarding of the contract. A request for an appropriation of $666,856 is to be made at the next meeting of the Board of Estimate. General Manager Duncan of the railway has stated that the work of relocating the tracks between Long Island City and Elmhurst would be completed within a period of 90 days, but during that time there will be no interruption to traffic.



THE total steam generating capacity of the light and power industry of the country reported by ELECTRICAL WORLD for 1925, from data collected by the U.S. Geological Survey and the U. S. Census Bureau, was 17,950,000 horse power. The total steam generating capacity designed and installed or under construction by Stone & Webster is 1,680,000 horse power. The corresponding total water power generating capacities are 8,500,000 horse power and 1,020,000 horse power. The combined totals of steam and water power for the country is 26,450,000 horse power and for Stone & Webster construction 2,700,000 horse power. Can we help you in planning new plants or extensions?

STONE & WEBSTER

INCORPORATED

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FINANCE

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CHICAGO, FIRST NATIONAL BANK BLDG.

SAN FRANCISCO, HOLBROOK BLDG.
PITTSBURGH, UNION TRUST BLDG.
PHILADELPHIA, REAL ESTATE TRUST BLDG.

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Organize, Manage, Operate and Finance

PUBLIC UTILITIES and INDUSTRIALS

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Electric Railways
Power Stations and Sub-Stations
Hydro-Electric Power Developments
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Water Supply and Irrigation Works
Industrial Plants and Buildings
Oil and Gas Properties
Oil Pipe Lines

❦

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Profitable Bus Operation Requires Trained Study of Sources of Traffic, Destinations, Routes, Trends, Schedules, Costs and Revenues, — an important Part of Our Business.

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New cars and efficient management did it in the "Attleboros"

Entire Capitalization of Bankrupt Railway Put on a Paying basis!

When Hemphill and Wells purchased the Interstate Consolidated Street Railway at Receivers sale in January 1925, the road was bankrupt and operating at a considerable loss. This deficit was before taxes, interest on funded debt and depreciation.

Following its purchase by Hemphill and Wells the name was changed to the Interstate Street Railway Company. The road was reorganized and the system modernized. About the same time the Attleboro Branch Railroad Company was purchased.

The two systems were co-ordinated and augmented with de luxe bus service. New modern cars were purchased and placed in operation. Through efficient management the company has attained enviable internal and public relations.

The result is that the net earnings of the co-ordinated system are now sufficient to pay a fair rate of return on the entire old capitalization as well as on the new money invested in modernizing the system!

Our services are available for transportation systems requiring similar treatment.

Appraisals and Investigations covering:
Reorganization—Management—Operating—Construction

HEMPHILL & WELLS
Consulting Engineers
43 Cedar St., New York City

Gardner F. Wells
Albert W. Hemphill

ONE of last year's outstanding achievements in the electrical industry was the modernization of the power plant, substations, transmission and distributing systems of the Staten Island Edison Corporation.

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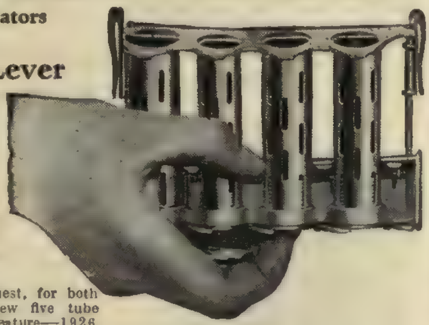

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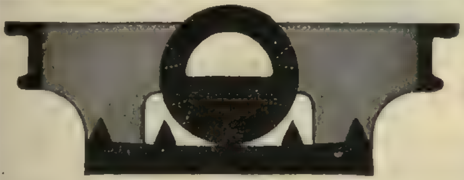

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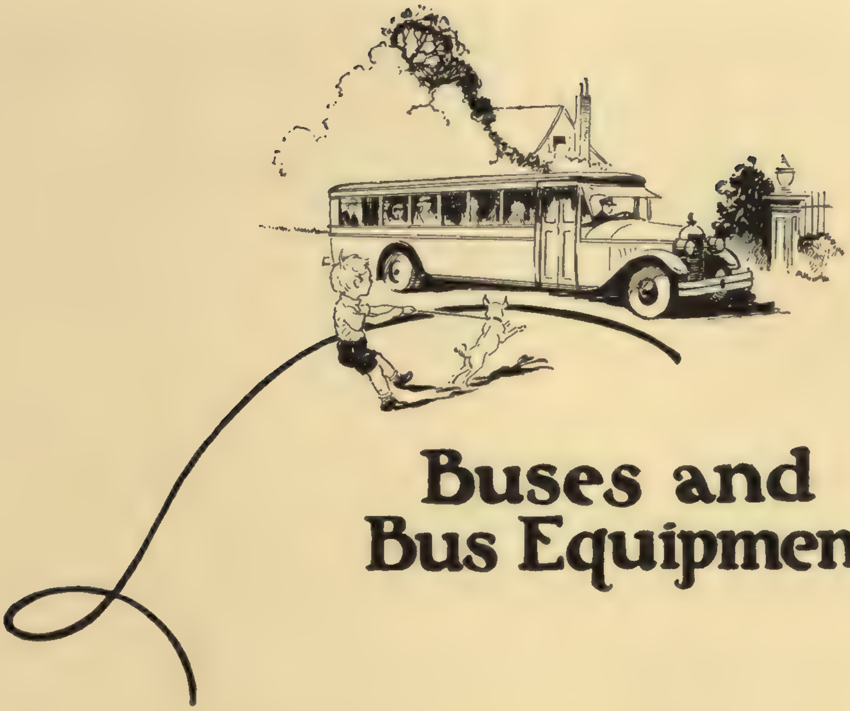

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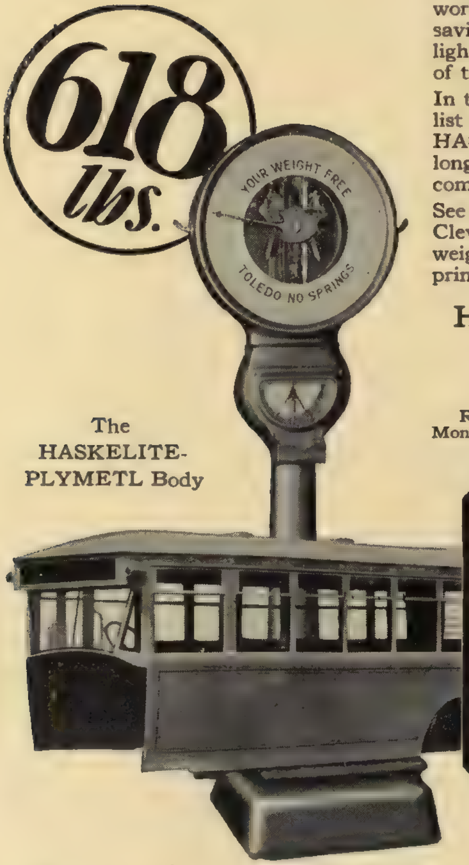

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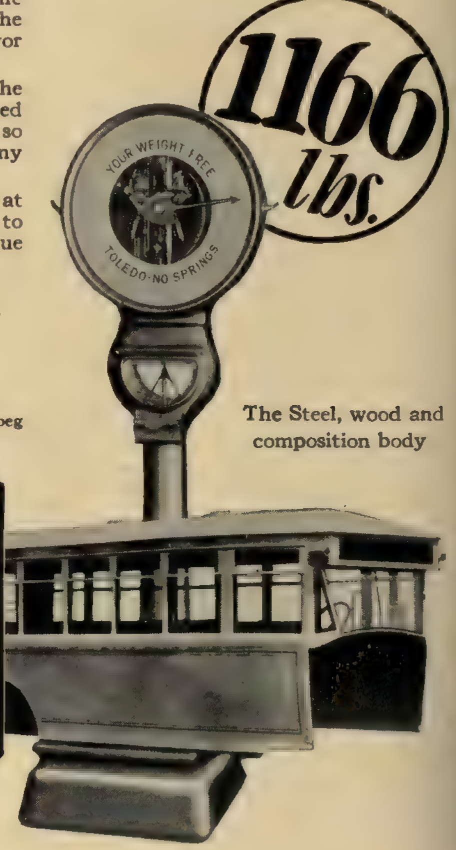

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sell the bus operator and builder because they have all the elements that make a sale.

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Steel surfaced plywood or pulpwood. The ideal side panel for any type of bus or street car.

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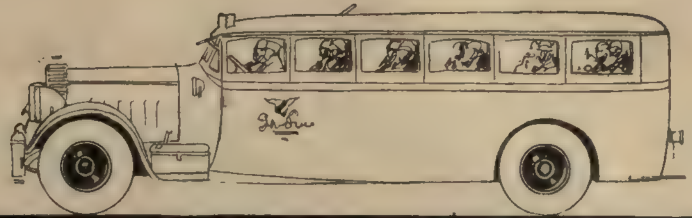

Budd-Michelin Dual Wheels are as old as the oldest bus, and as new as the newest.

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25 to 29 Passengers—The White Model 50-B, long-tried and proven in design and air-brake equipped, will continue to be a steady earner where large busses are operated. After hundreds of thousands of money-earning miles White Busses continue to make money. Model 50-B chassis, $5,350, f. o. b. Cleveland. Write for complete specifications and delivery dates on either chassis.

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Drop frame . . . high radiator and stream-line hood . . . balloon tires . . . powerful White engine . . . 14 to 21 passengers . . . progressive type rear springs . . . specially designed axles . . . White exclusive brake design . . . every requirement for comfort of passengers, for ease and simplicity of handling and for profit in operation has been anticipated in this Model 53. Chassis $4,250, f. o. b. Cleveland. Write for complete specifications and delivery dates.

Various models of White Busses and White Trucks will be on display at the A. E. R. A. Convention exhibit in Cleveland.

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WHITE

--that's the acid test

–and White Model 53, the Quality Small Bus, is a money-maker in a new and rapidly expanding field

The Quality Small Bus — White Model 53 — has already demonstrated to many owners that it has the unfailing ability of all White Busses to earn profits.

Development of passenger transportation has made a definite place for the sturdy, dependable bus of small or medium capacity. . . . . And White Model 53 is that bus.

With it you can increase the number of trips or cut down headway.

You can use it to feed car lines or bigger busses on trunk line routes.

You can run it profitably on routes where large busses are impractical.

It decreases operating expense. It increases revenues. It is safe, comfortable, flexible, attractive. It better serves the riding public.

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Protecting White Bus operators' investments and insuring their earnings are—The White Company, sound, stable, experienced, practical, a leader always . . . . and White Service everywhere, quick, well-done at low cost.

New uses of busses develop. Transportation makes new demands. Experience suggests new methods of operation and improves old ones. But one fact *does not change*. Bus operators must make money . . . . White Bus operators do.

THE WHITE COMPANY
CLEVELAND

CONVENTION IN CLEVELAND, OCTOBER 4 TO 8

BUSSES

What SUPERTWIST Adds to Goodyear Tires

Goodyear Balloon Tire Equipped Coach No. 214 of the Colonial Coach Lines, Watertown, New York

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

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They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

Goodyear Means Good Wear

GOODYEAR

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DIXON'S "677"

Graphite Grease

for Transmissions and Differentials

also for use in high pressure lubricating systems

AERA Convention

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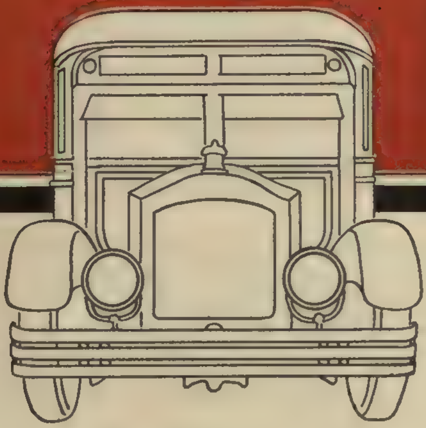

So exactly suited to bus service that its use will—

1. Save a substantial amount of power.

2. Make gear changing smooth, easy and silent in all weather.

3. Result in such protection of gears that wear and friction are practically eliminated.

Unlike ordinary greases, DIXON'S 677 gives heavy-duty, high-speed gears the protection of an infinitely fine, smooth, wear-resistant graphite film, in addition to a film of pure mineral grease. This prevents actual metal to metal contact—makes for quieter running, and reduces wear to a minimum. Of correct consistency "677" flows easily, yet will not run off the gear faces when idle or squeeze out under load, thus affording utmost protection. Furthermore "677" is unaffected by either heat or cold. It makes gear changing easy and silent throughout the year—a boon to drivers, a blessing to passengers.

And used in the grease gun "677" gives equal protection to all pressure greased bearings or surfaces. Joseph Dixon Crucible Co., Jersey City, New Jersey. Established 1827.

Dixon's 677 is used and endorsed by Royal Blue Line.

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6-Cylinder

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THESE quality conveyances are qualified to *make* coach route operation profitable and to *keep* it profitable. All over the land and in foreign lands they are doing just that. International coach fleets in the hands of well-known public utility and steam and electric railway corporations, and in the service of individual operators, in three years' continuous running have established International economy, safety, comfort and popularity.

International coaches express the many years of Harvester experience, now nearing the century milestone in heavy-duty machine development, and the quarter-century mark in automotive experience. Not content with quality manufacture, this Company has perfected an unparalleled service alliance with the tens of thousands of owners of its automotive products.

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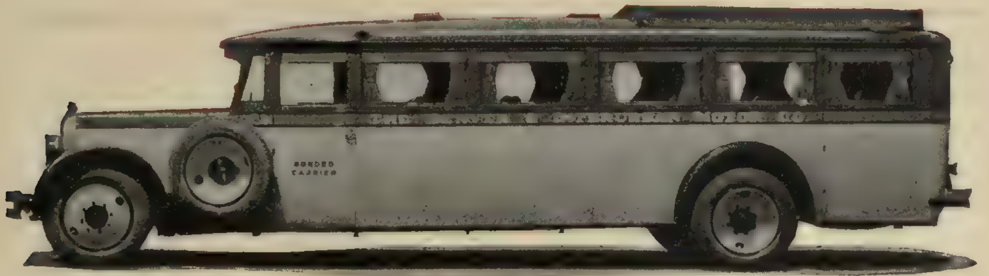
HARVESTER
Motor Coaches



THE DENVER & INTERURBAN MOTOR COMPANY, *Denver, a subsidiary of the Chicago, Burlington & Quincy Ry., chooses International Coaches for negotiating the difficulties of mountain highways. Its coaches, of which one is illustrated, are in operation between Denver and Boulder, Colo., in the foothills of the Rockies.*

International Harvester Offers You Both — 6-Cylinder Coaches of Unexcelled Reputation and Matchless Service Facilities

Our coaches are delivered superbly equipped for the road. With the convenience-comfort-luxury details are embodied these

SUPER-SAFETY *Features*

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Low center of gravity
Rugged frame
Sturdy body assembly
Wide tread
Short-turn radius
Double bumpers on front and single spring bumpers on rear
Foot-operated headlight dimming control
Reserve power for all possible emergencies

International
Motor Coaches
will be on display
at the A. E. R. A.
Convention,
Cleveland, Ohio
October 4-8, 1926
Spaces 356-7-9

One of a fleet of 49 Internationals owned by the Shore Line Motor Coach Company of Gary, Ind., operating a Gary-Chicago route and other routes radiating from Gary. Several are street car type as above, but the majority are de luxe models. Unusually strenuous service, with many coaches averaging 250 miles per day, finds them strongly in favor with owners and traveling public.

Detail information regarding International 6-cylinder Coaches will be furnished on request.

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of AMERICA (Incorporated) Chicago, Illinois

See the Gruss Air Spring
Exhibit A. E. R. A. Convention Week of Oct. 4.
Cleveland, Ohio.

THE CLEVELAND
PNEUMATIC TOOL CO.,
Cleveland, O.

THE fact that 13 different manufacturers of trucks and buses now offer Gruss Air Springs as either standard or optional equipment is conclusive proof of the fact that the "Gruss Twins" are a product of exceptional mechanical accuracy and simplicity.

THE CLEVELAND PNEUMATIC TOOL CO., Cleveland, O.

GRUSS AIR SPRINGS

for Trucks, Buses
Passenger Cars ~

Mack
Not just another six
—a Mack 6--
512

Mack waited to be sure, then went ahead with the Mack 6

The trend of modern transportation by bus has been toward longer and more difficult routes; stiffer road conditions, higher mountains to be climbed.

Mack has realized all this, and so Mack engineers were given the task of developing a 6 to meet new standards of service with new standards of design.

In the accomplishment of this work they were not hurried. It was a problem not to be solved overnight. They were not content to put a 6-cylinder motor in a 4-cylinder chassis. The goal toward which they labored was a harmonious balance between mechanical performance and economy—the positive assurance of income and economy of operation.

Building accurately on the firm performance foundation of Mack 4-cylinder models, five different 6-cylinder chassis were designed, built and subjected to the most grueling tests. Five were scrapped before the labor of years resulted in a 6 behind which Mack could stand one hundred per cent.

Six distinctive points found in the Mack 6 are described in the following pages. They picture a new conception of power, hill climbing ability, luxurious riding and economy of operation.

Mack waited. Mack wins.

Mack 6

Point Number 1
The Powerful Engine

In developing this Mack 6 engine, Mack engineers specified certain objectives.

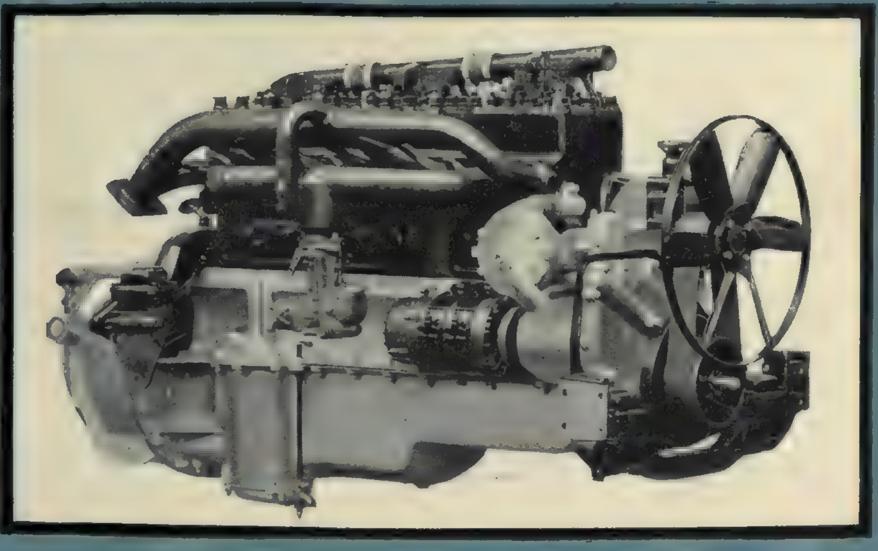
For one, it must have *mechanical balance,* hence maximum torque is developed at surprisingly low speed and its 96 horsepower developed at comparatively moderate speeds. Always there is a tremendous reserve. Remarkable flexibility is present at all times. *And steep hills prove how it can pull the load!*

Drive behind this Mack 6 engine and you will instantly be impressed with two things. 1. Its velvet smoothness. 2. Its freedom from vibration. Causes for this are due largely to the exceptionally stiff crankshaft of the counterbalanced type, mounted on four bearings of exceptionally large size: 3½ inches in diameter and totaling 11 inches in length. Journals are case hardened (hard as plate glass) while the body of the shaft is left tough.

Connecting rods are of tubular construction, machined from a solid dropped forging. Cylinders are cast in block, while the removable heads are cast in pairs, thus insuring against their distortion. Valves are situated in L head arrangement, actuated by roller type lifters from the four-bearing camshaft driven by case-hardened steel timing gears.

And the entire power plant is mounted upon rubber shock insulators—*under compression.*

The Mack 6 engine is all Mack—in design, in manufacture, in performance.



Mack 6

Point Number 2
Specially Designed Transmission

Mack engineers started with the premise that the transmission for the 6 must be specially designed to handle the abundant power of the Mack 6 engine. Hence, the transmission used in the Mack 6 has ratios designed to harmonize with—

Load and rear axle gear ratios.
Torque characteristics of engine.

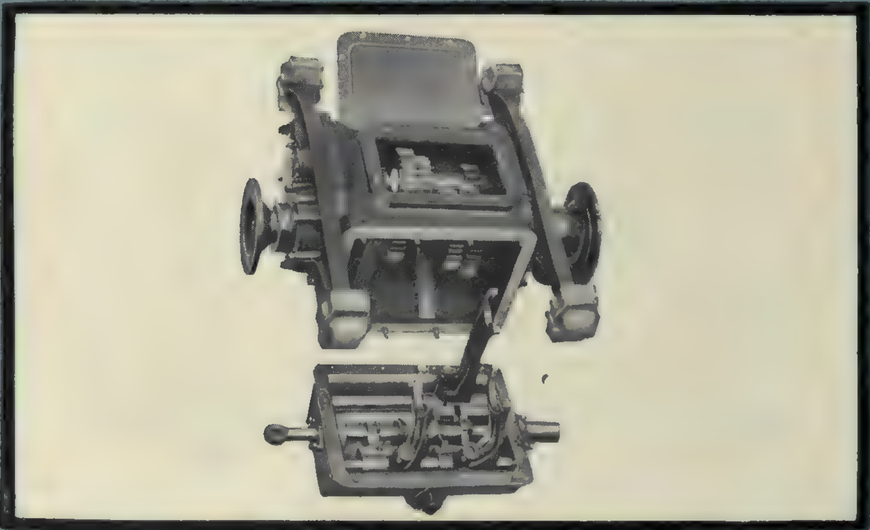
Only by developing special ratios for bus service can the best results be secured. This principle is worked out successfully in the Mack 6. Sturdy construction and large gears, permitting low tooth pressures, guarantee freedom from trouble and assure long life even with the tremendous power transmitted.

A new step forward in accessibility is taken by locating the opening to the transmission *at the side;* the proper and easiest position from which to work on a bus.

Gears are uncommonly liberal in face area and are so proportioned that tooth speeds are slow, thus facilitating easy shifting. The sliding gears are mounted on Mack interrupted spline shaft; constant mesh, high speed and third speed gear teeth being generator ground.

And the entire transmission unit is mounted on rubber shock insulators—*under compression.*

In successful bus operation, much depends on the transmission. You can depend to the fullest extent on Mack.



Mack 6

Point Number 3
Resistance to Vibration

In the Mack 6 resistance to vibration has been carried to a point further than anything previously attempted.

Mack nullifies vibration in two ways.

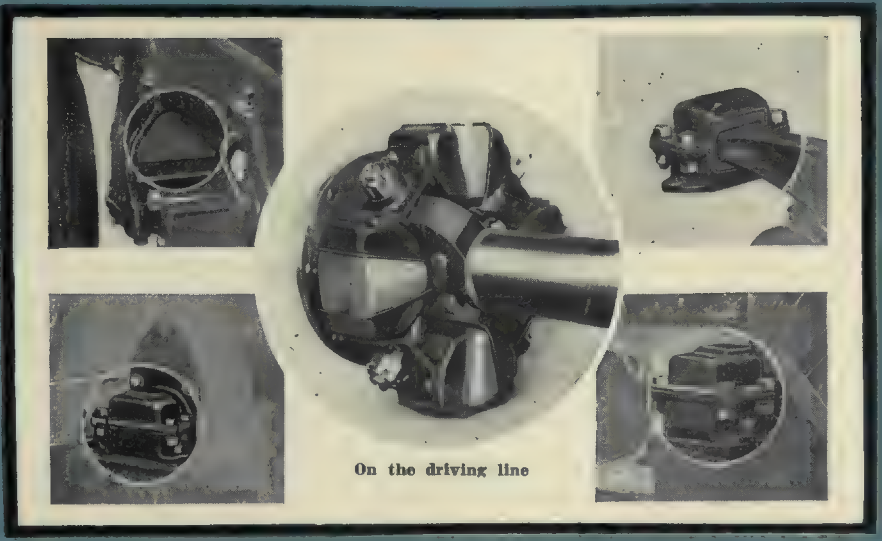
1. By eliminating the causes of vibration at the source.
2. By damping out those causes that cannot be avoided.

Causes of vibration at the source are eliminated by perfect balance of reciprocating engine parts, made possible by tubular connecting rods, machined all over. Crankshaft is of greater diameter than before attempted and balance counterweights are used to put it in complete running balance. Shaft, clutch and flywheel are all put in dynamic balance.

Vibrations due to irregular power impulses are eliminated by perfect gas distribution in the manifold by uniform combustion chamber volume. Uniform valve action is assured by the use of conical valve springs which do not flutter—at any speed.

Roller type valve lifters produce maximum valve opening dwell, without jumping off the cams. Four-bearing cam shaft is exceptionally rigid. Direct helical gear camshaft drive eliminates galloping; the greatest defect of cam chain drive. Driveshaft is split up into short sections by five universal joints, eliminating whip.

To dampen out those causes of vibration that cannot be avoided, Mack makes use of Rubber Shock Insulators at the following points—springs, radiator, steering column and steering column bracket, engine support, transmission support, gasoline tank mounting. Mack torque insulator dampens out vibrations along the driving line.



Mack 6

Point Number 4

New Conception of Riding Ease

The Mack 6 marks a new era in riding ease and comfort.

First, Mack engineers gave long and careful study to spring design, for after all a bus rides on its springs. Mack springs, therefore, are long and flat, scientifically designed for the exact duty required of them, and mounted in rubber shock insulators—*under compression.*

The Mack 6 rides easily and hugs the road due to the low suspension which at the same time, affords ample road clearance. Wheel tread is unusually wide. Extra rigidity is built into the frame, which is free from drops and kinks.

The special live spindle Lemoine type front axle permits shorter turning radius and greater ease of steering.

Over rough roads the Mack 6 swings along with a floating motion that surprises passengers. It is easily the most luxurious and comfortable riding bus yet produced, designed and built to give a new conception of easy travel.

Mack 6

Point Number 5
Ease of Handling—

Just as the Mack 6 gives a new conception of riding ease so is a new conception achieved in the matter of ease of handling.

"As easy to drive as a pleasure car," applies to this new Mack.

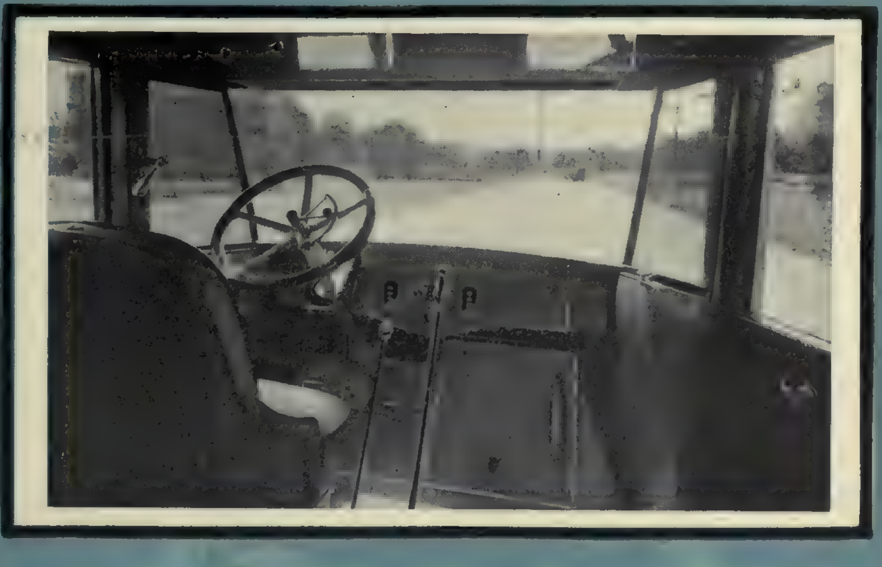
Outstanding among the many special features which contribute to simplicity of handling is a type of front axle never used in this country before—a live spindle Lemoine type axle. With this axle, true center point steering is accomplished with vertical steering knuckles. Knuckle and hub are made in one piece. The steering gear is of worm and complete gear type, with gears of unusually large size and lapped in perfect mesh with the ground wormwheel. Perfect alignment of wheels assured by micrometer adjustment of the tie-rod.

Steering gear is 16 to 1 reduction, controlled by a 20-inch flexible rubber steering wheel raked at a touring car angle.

Clutch is single dry plate type and operates smoothly. Foot brake applied without effort, due to vacuum booster brake system.

Shifting gears is accomplished by an unusually long, straight lever, located at some distance to the left of the center of the chassis where it is convenient to the driver's hand and out of the way of passengers.

It's a pleasure to handle the Mack 6.



Mack 6

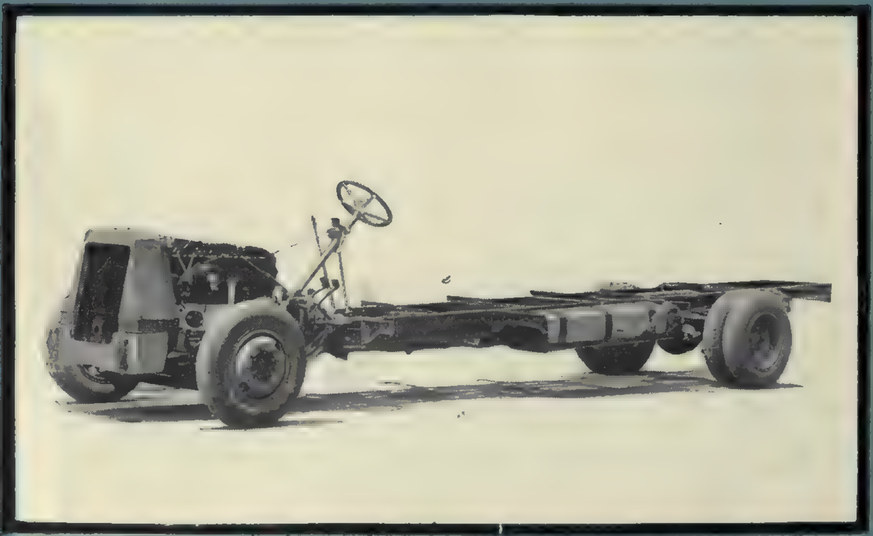
Point Number 6
Power with Economy

To secure increased power itself is no remarkable task. To balance increasing power with economy of operation is quite a different story and calls for the highest degree of engineering skill.

Mack's real achievement lies in producing and economical 6–a 6 in which the cost of operation *does not* increase disproportionately with the added amount of power.

The accomplishment of this was only possible by the most careful design based on long experience over many years in building heavy duty, powerful gasoline engines.

The ruggedness and stamina built into the Mack 6 assure minimum wear and guarantee long life. Road conditions and the stiff demands of operating service are met with increased power delivered with economy. It is this balance for which Mack engineers labored and finally achieved.



When it Comes to a Show-down Mack Engineering Wins

From bumper to tail light the Mack 6 is a revelation of what can be accomplished when engineering genius is not stampeded.

Operators, themselves, established the standard of requirements. They demanded a six cylinder bus of both the city and parlor car types, swifter, more powerful and smoother than anything heretofore available, without appreciable increase in weight and size.

Mack engineers have given them what they wanted—powerful, compact and graceful, assuring increased performance, at the same time preserving smoothness of operation—economically.

While the new 6 was built primarily for inter-urban service where additional power is most needed, conditions in some cities, however, demand the power which a 6 can render. To meet this requirement the 6-cylinder City Type Mack has also been provided. Again, certain conditions of city service call for a Gas-Electric and Mack builds a 6 of this type, as well.

There's a Mack for Ever
Transportatio

Buses — Trucks — Tracto

This subsidiary of the Union Pacific Railroad is one of the many traction lines that have found the Mack City Type profitable.

Mack's latest creation, the new 6, fulfills the expectations of the industry and completes the Mack line.

The Boston & Worcester Railway operate these Mack parlor cars, profitably, on their main line

Passenger Transportat

With the Mack 6 taking its p
as an additional model, the M
line of buses for passenger tr
portation is complete.

Longer and more difficult ro
are being planned by opera
higher mountains must be n
tiated and stiffer road condi
will be encountered as ro
branch out into less devel
territory. It is for such re
that the powerful Mack 6
been built.

At the same time, the 4-cyli
models, which for years
been building Mack reputa
will be available, just as be
—city type, gas or gas-ele
and parlor car.

Whatever your requiren
may be, whether for short h
in city service or long swee
runs through the country, t
is a Mack bus to meet
specific requirements with
kind of economical perform
that builds revenue.

Mack buses
in the follow

25-29 Passenger, 4-cylinder,
City Type

25-29 Passenger, 4-cylinder
Parlor Car Type

25-29 Passenger, 4-cylinde
City Gas-Electric

ype of Commercial
ervice

e Apparatus — Railcars

Freight Handling

: Mack is doing for passen-
ransportation is duplicated
other way in other spheres
nmercial transportation.

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andise, in repair work,
enance of right of way
where emergency and
trucks are used Mack
s and Tractors are kept
Tractor and trailer fleets,
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ake place while the tractor
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ation, are also extensively
thus saving time and in-
ing economy. And Mack
s, with detachable con-
bodies, are growing in
with Traction Lines hav-
eight-handling problems.

service is unlimited.
ner for moving passengers
ight, you need not reach
d the complete Mack line
d the answer to your
m.

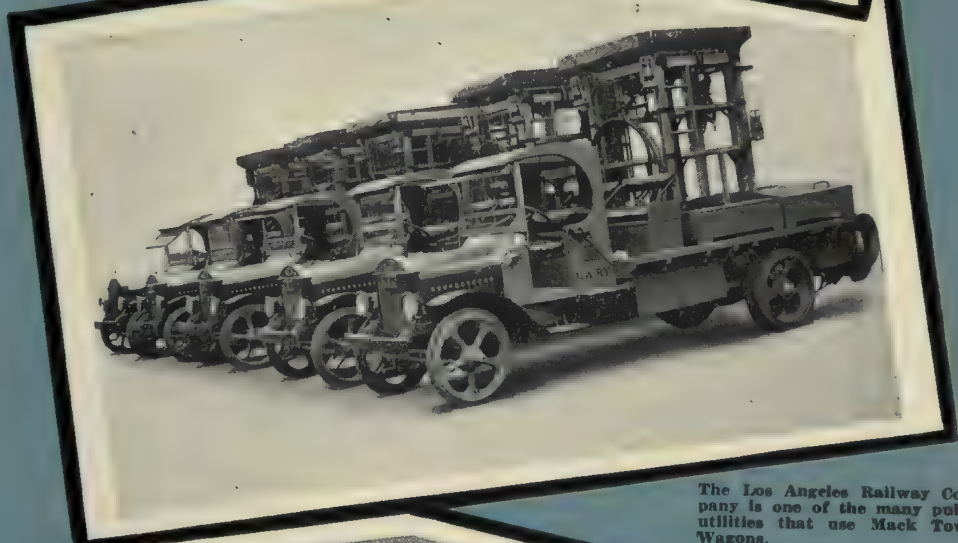
be obtained
els and types—

ssenger, 6-cylinder,
Type

ssenger, 6-cylinder,
or Car Type

ssenger, 6-cylinder,
Gas-Electric

The Mack Wrecker, equipped with the Mack Winch, has made a reputation for itself in the street car industry.



The Los Angeles Railway Company is one of the many public utilities that use Mack Tower Wagons.

Mack Trucks, with transferable container bodies, are used in increasing numbers to handle efficiently freight shipments

The Service Behind the Mack 6

—Whenever you serve the public Mack serves you—

More than 100 Mack Service Stations are equipped to service the Mack 6. Thus, like the entire Mack line, your Mack 6 is always within reach of expert service, trained automotive mechanics, and parts.

Mack never puts out a job that it cannot stand behind.

DIRECT FACTORY BRANCHES

AKRON, O.
Mack-International Motor Truck Corp.
823 W. Colburn St.
ALBANY, N. Y.
Mack-International Motor Truck Corp.
135 Ontario Street
ALLENTOWN, PA.
Mack-International Motor Truck Corp.
ATLANTA, GA.
Mack-International Motor Truck Corp.
316 Spring Street
BALTIMORE, MD.
Mack-International Motor Truck Corp.
1210-28 E. 20th Street
BILLINGS, MONT.
Mack-International Motor Truck Corp.
305 N. 30th St.
BIRMINGHAM, ALA.
Mack-International Motor Truck Corp.
2501 Ave. F
BOISE, IDAHO
Mack-International Motor Truck Corp.
1016 Bannock Street
BOSTON, (Allston) MASS.
Mack Motor Truck Co.
75 N. Beacon St.
BRIDGEPORT, CONN.
Mack Motor Truck Co.
3240 Fairfield Ave.
BRIDGEPORT, PENNA.
Mack-International Motor Truck Corp.
28-34 W. 4th Street
BRONX, N. Y.
International Motor Co.
Leggett Ave. and Barry St.
BROOKLYN, N. Y.
International Motor Company
73 Empire Boulevard
BUFFALO, N. Y.
Mack-International Motor Truck Corp.
Jefferson and E. Delevan Aves.
BUTTE, MONT.
Mack-International Motor Truck Corp.
836 W. Galena Street
CAMDEN, N. J.
Mack-International Motor Truck Corp.
8th and Market Sts.
CHARLOTTE, N. C.
Mack-International Motor Truck Corp.
410 W. Fourth Street
CHATTANOOGA, TENN.
Mack-International Motor Truck Corp.
1129 Fort St.
CHICAGO, ILL.
Mack-International Motor Truck Corp.
33rd St. and Wentworth Ave.
CINCINNATI, O.
Mack-International Motor Truck Corp.
1223 West 8th St.
CLEVELAND, O.
Mack-International Motor Truck Corp.
7001 Carnegie Avenue
COLUMBUS, O.
Mack-International Motor Truck Corp.
517 N. Park St.
DALLAS, TEX.
Mack-International Motor Truck Corp.
1900 S. Ervay Street
DAVENPORT, IOWA
Mack-International Motor Truck Corp.
Cor. Front and Brown Sts.
DAYTON, O.
Mack-International Motor Truck Corp.
34-36 Deeds Avenue
DENVER, COLO.
Mack-International Motor Truck Corp.
585 Broadway
DES MOINES, IOWA
Mack-International Motor Truck Corp.
1122 Mulberry Street
DETROIT, MICH.
Mack-International Motor Truck Corp.
5133 Grand River Avenue
DULUTH, MINN.
Mack-International Motor Truck Corp.
215 East First Street
ERIE, PA.
Mack-International Motor Truck Corp.
1921-23 State St.
EVERETT, WASH.
Mack-International Motor Truck Corp.
2932 Broadway
FALL RIVER, MASS.
Mack Motor Truck Co.
914 Pleasant St.
FLINT, MICH.
Mack-International Motor Truck Corp.
4005 S. Saginaw St.
FORT WORTH, TEX.
Mack-International Motor Truck Corp.
505 W. Weatherford Street
FRANKFORD, PA.
Mack-International Motor Truck Corp.
Torresdale Ave. and N. St.
FRESNO, CALIF.
Mack-International Motor Truck Corp.
1652 "H" Street
HARRISBURG, PA.
Mack-International Motor Truck Corp.
721-728 South Cameron Street
HARTFORD, CONN.
Mack Motor Truck Company
7091 Windsor Street
HOUSTON, TEXAS
Mack-International Motor Truck Corp.
1809 Travis St.
INDIANAPOLIS, IND.
Mack-International Motor Truck Corp.
729 North Capitol Avenue
JACKSONVILLE, FLA.
Mack-International Motor Truck Corp.
315-327 Park St.
JERSEY CITY, N. J.
Mack-International Motor Truck Corp.
West Side Ave. at Newark Ave.
KANSAS CITY, MO.
Mack-International Motor Truck Corp.
2605 Warwick Boulevard
KNOXVILLE, TENN.
Mack-International Motor Truck Corp.
213 West Depot Avenue
LITTLE ROCK, ARK.
Mack-International Motor Truck Corp.
315 West 12th Street
LONG BEACH, CALIF.
Mack-International Motor Truck Corp.
2345 E. Anaheim St.
LONG ISLAND CITY, N. Y.
International Motor Co.
Anable Ave. and 34th St.
LOS ANGELES, CAL.
Mack-International Motor Truck Corp.
20th and Alameda Sts.
LOUISVILLE, KY.
Mack-International Motor Truck Corp.
510-16 S. Brook St.
LOWELL, MASS.
Mack Motor Truck Company
39 First St.
MANCHESTER, N. H.
Mack Motor Truck Company
664 Chestnut St.
MEMPHIS, TENN.
Mack-International Motor Truck Corp.
980 Jefferson St.
MIAMI, FLA.
Mack-International Motor Truck Corp.
2101 N. Miami Ave.
MILWAUKEE, WIS.
Mack-International Motor Truck Corp.
419 Prospect Avenue
MINEOLA, L. I.
International Motor Co.
393 Jericho Turnpike
MINNEAPOLIS, MINN.
(Twin City)
Mack-International Motor Truck Corp.
2234 University Ave., Midway (Minn.)
NASHVILLE, TENN.
Mack-International Motor Truck Corp.
801 Lea Avenue
NEWARK, N. J.
Mack-International Motor Truck Corp.
1232 Broad Street
NEW HAVEN, CONN.
Mack Motor Truck Company
151 Orange Ave., (Westhaven)
NEW ORLEANS, LA.
Mack-International Motor Truck Corp.
737 Magazine St.
NEW YORK, N. Y.
International Motor Company
64th Street and West End Avenue
NORFOLK, VA.
Mack-International Motor Truck Corp.
204 W. 24th Street
NORWICH, CONN.
Mack Motor Truck Co.
175 N. Main St.
OAKLAND, CAL.
Mack-International Motor Truck Corp.
4902 E. 12th St.
OGDEN, UTAH
Mack-International Motor Truck Corp.
OKLAHOMA CITY, OKLA.
Mack-International Motor Truck Corp.
428 W. 2nd St.
OMAHA, NEBR.
Mack-International Motor Truck Corp.
2752 Farnam St.
ORANGE, CALIF.
Mack-International Motor Truck Corp.
777 West Chapman Avenue
ORLANDO, FLA.
Mack-International Motor Truck Corp.
855 Church St.
PATERSON, N. J.
Mack-International Motor Truck Corp.
931 E. 24th St.
PHILADELPHIA, PA.
Mack-International Motor Truck Corp.
42nd and Woodland Ave.
PHOENIX, ARIZ.
Mack-International Motor Truck Corp.
First and Van Buren Streets
PITTSBURGH, PA.
Mack-International Motor Truck Corp.
Liberty Ave. and Gross St.
POMONA, CAL.
Mack-International Motor Truck Corp.
Wurl's Garage
PORTLAND, ME.
Mack Motor Truck Company
4 York Street
PORTLAND, ORE.
Mack-International Motor Truck Corp.
285 Oregon Street
PROVIDENCE, R. I.
Mack Motor Truck Company
1124 N. Main St.
RALEIGH N. C.
Mack-International Motor Truck Corp.
Davies and East Streets
READING, PA.
Mack-International Motor Truck Corp.
1212 Moss Street
RICHMOND, VA.
Mack-International Motor Truck Corp.
Boulevard and Leigh St.
ROCHESTER, N. Y.
Mack-International Motor Truck Corp.
150 South Avenue
SACRAMENTO, CAL.
Mack-International Motor Truck Corp
3160 M Street
ST. LOUIS, MO.
Mack-International Motor Truck Corp.
2800 Pine Street
ST. PAUL, MINN.
(Twin City)
Mack-International Motor Truck Corp.
2234 University Ave., Midway (Minn.)
ST. PETERSBURG, FLA.
Mack-International Motor Truck Corp.
2710 Fourth Street, North
SALT LAKE CITY, UTAH
Mack-International Motor Truck Corp.
163 Motor Ave.
SAN BERNARDINO, CAL.
Mack-International Motor Truck Corp.
206 "E" Street
SAN DIEGO, CAL.
Mack-International Motor Truck Corp.
Second and "G" Streets
SAN FRANCISCO, CAL.
Mack-International Motor Truck Corp.
Eleventh and Howard Streets
SAN JOSE, CALIF.
Mack-International Motor Truck Corp.
736 South First Street
SCHENECTADY, N. Y.
Mack-International Motor Truck Corp.
103 Weaver Street
SCRANTON, PA.
Mack-International Motor Truck Corp.
Cor Wash. Ave. and Walnut Street
SEATTLE, WASH.
Mack-International Motor Truck Corp.
Ninth Ave. and Roy Street
SELMA, ALA.
Mack-International Motor Truck Corp.
11-13 Church St.
SHREVEPORT, LA.
Mack-International Motor Truck Corp.
2060 Texas Avenue
SIOUX CITY, IOWA
Mack-International Motor Truck Corp.
825 Pierce Street
SPRINGFIELD, MASS.
Mack Motor Truck Company
1236-40 State St.
STOCKTON, CAL.
Mack-International Motor Truck Corp.
24 North Aurora Street
SYRACUSE, N. Y.
Mack-International Motor Truck Corp.
819 W. Genesee St.
TACOMA, WASH.
Mack-International Motor Truck Corp.
419 S. 7th St.
TAMPA, FLA.
Mack-International Motor Truck Corp.
Cor. Packwood Ave. and Platt St.
TOLEDO, OHIO
Mack-International Motor Truck Corp.
2221 Detroit Ave.
TULSA, OKLA.
Mack-International Motor Truck Corp.
105 North Boulder Ave.
WASHINGTON, D. C.
Mack-International Motor Truck Corp.
57-59 L St., S. E
WATERBURY, CONN.
Mack Motor Truck Company
1188 So. Main St.
WEST PALM BEACH, FLA.
Mack-International Motor Truck Corp.
Georgia Ave. and Palm Road
WHITE PLAINS, N. Y.
International Motor Co.
58 Orawaupum Street
WILKES-BARRE, PA.
Mack-International Motor Truck Corp.
221 S. Washington Ave.
WORCESTER, MASS.
Mack Motor Truck Company
1143 Main Street

TORONTO, ONTARIO
Mack Trucks of Canada, Ltd.
1941 Yonge Street

Agency representatives in leading foreign countries

EVERY MAKE & EVERY MODEL & EVERY TYPE OF MOUNTING

There were Timken Tapered Roller Bearings in every model of every make of bus and truck exhibited at the recent convention of the American Railway Association. ✽ ✽ ✽ ¶There were repeated examples of bus and truck chassis engineered completely around Timken Tapered Roller Bearings—in transmissions, differentials, pinion or worm drives, rear wheels, front wheels, steering pivots and fans. ✽ ✽ ✽ ¶The old masters of transportation, scrutinizing the newest arm of transportation, found it 100% for Timken! *THE TIMKEN ROLLER BEARING CO., CANTON, OHIO*

TIMKEN *Tapered Roller* **BEARINGS**

American Car an

a.c.f.
Hall-Scott

oundry Motors Company

Revealing the most interesting and most important motor coach developments since the original Fageol

at the Cleveland Convention

American Electric Railway
Association
October 4-8

Patronage Builders for Long or Short Hauls

The long hauls of city to city service and the short but constant hauls of suburb and city can be maintained *profitably* through use of the motor bus.

As a *patronage builder* the motor bus has rapidly forged to the front. Right now it occupies an outstanding position in the transportation field.

To be of greatest value, however, the motor bus must be powered with a *motor* that will enable the operator to keep consistently to a definite schedule. *Dependability* in daily operation is a vital necessity for patronage and profits.

Continental Red Seal Motors furnish that *steady flow of power* which insures *passenger comfort,* with a reserve which conquers heavy going on steep hills or winding roads.

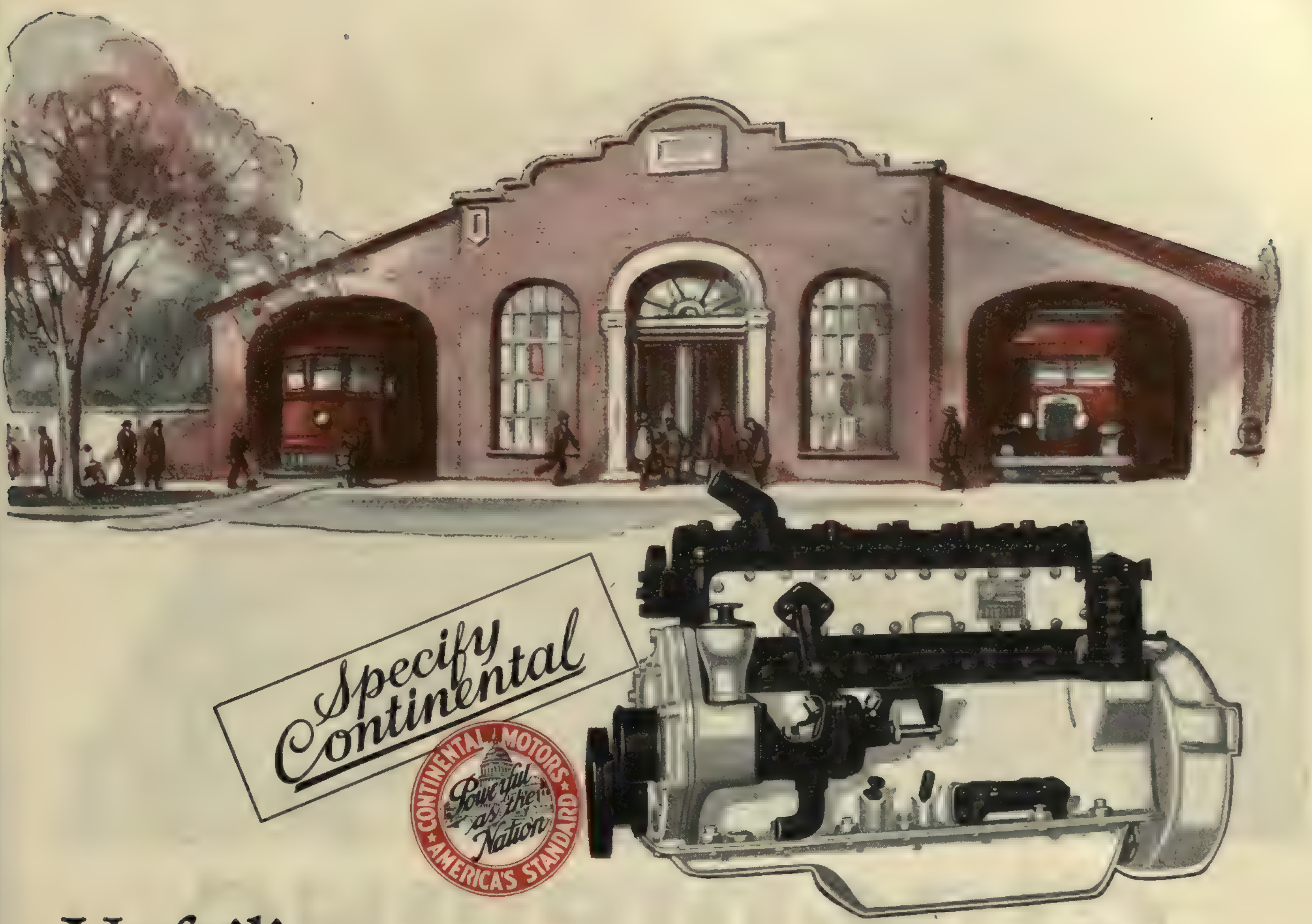
CONTINENTAL MOTORS · AMERICA'S STANDARD

Powerful as the Nation

DEPENDABLE
POWER
FOR EVERY
PURPOSE

CONTINENTAL MOTORS CORPORATION
Offices: Detroit, Mich., U.S.A. *Factories:* Detroit and Muskegon
The Largest Exclusive Motor Manufacturer in the World

Continental Motor



Unfailing

Performance for Daily Service

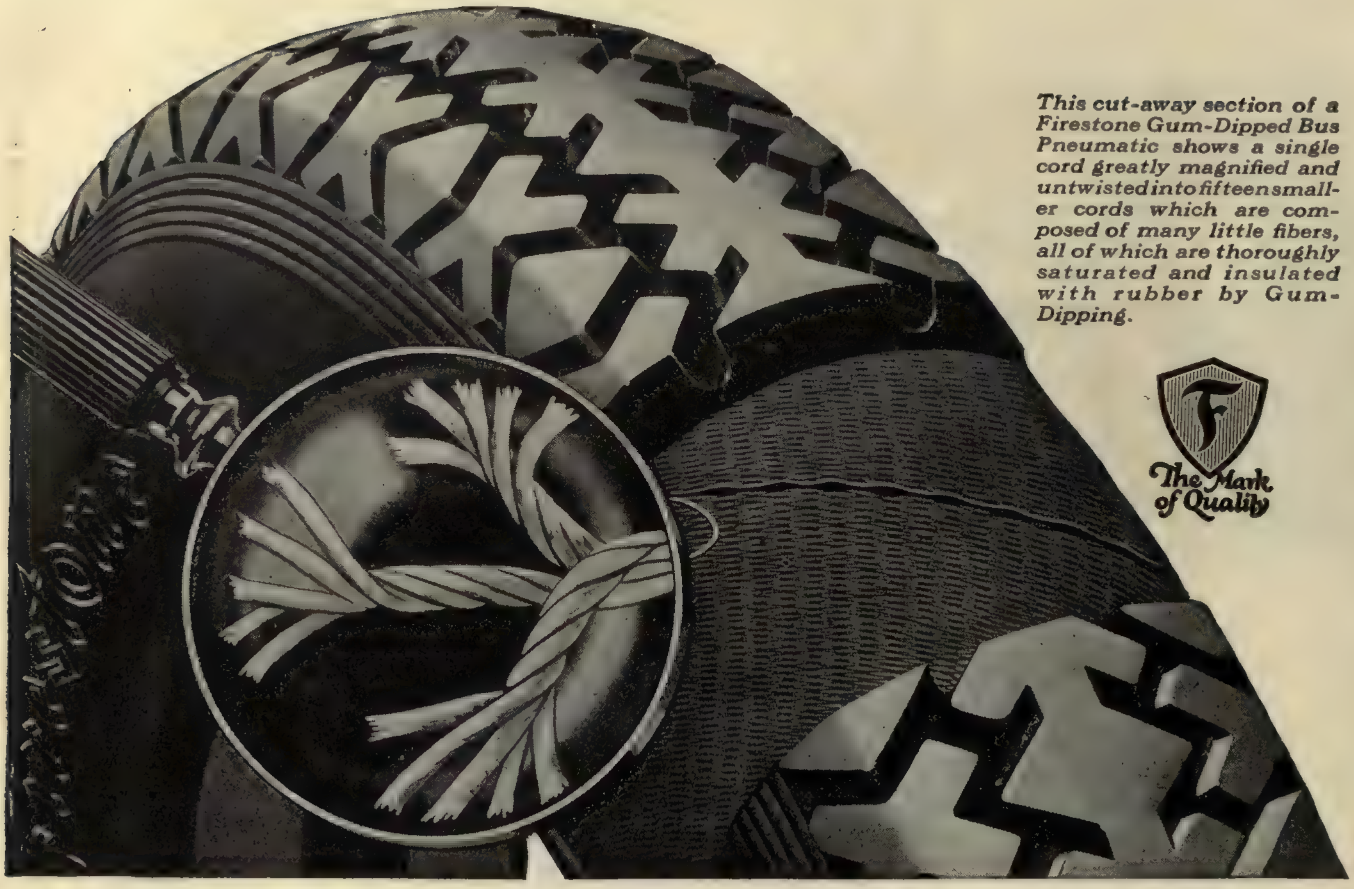
The *economical operation* of the motor bus depends upon its readiness for day in and day out use. This in turn hinges, to a great extent, upon the *performance* of the motor.

Continental Motors for bus use are designed to meet the gruelling demands of the bus driver. Continental engineers, through 26 years of specializing on the building of motors, know the *proper type* to fit the need. Their recommendations are based upon unusually exhaustive tests covering a period of many years.

As a *result Continental Bus Motors* stand up under the unusual demands of this service and operate economically over *long periods* of time.

CONTINENTAL MOTORS CORPORATION
Offices: Detroit, Mich., U. S. A. *Factories:* Detroit and Muskegon
The Largest Exclusive Motor Manufacturer in the World

Continental Motors



This cut-away section of a Firestone Gum-Dipped Bus Pneumatic shows a single cord greatly magnified and untwisted into fifteen smaller cords which are composed of many little fibers, all of which are thoroughly saturated and insulated with rubber by Gum-Dipping.

The Mark of Quality

GUM-DIPPING

The Extra Process for Extra Miles and Extra Safety for Bus Operators

Gum-Dipping, the extra Firestone process, gives to Firestone Bus Pneumatics greater stamina—longer mileage — and added safety. Gum-Dipping goes to the very heart of every cord, thoroughly saturating and impregnating every fiber with rubber—minimizing internal friction and heat, one of the most persistent causes of tire failures.

The special Firestone Non-Skid tread of scientifically designed angles and edges gives to Firestone Gum-Dipped Pneumatics, the dependable road-grip that holds the motor bus on slippery roads—reducing skidding in traffic and increasing braking efficiency.

Still greater protection is assured by the special Steam-Welding process that makes Firestone Tubes an endless airtight unit. Your Firestone dealer can serve you better and save you money—see him.

MOST MILES PER DOLLAR

Firestone

GUM-DIPPED TRUCK AND BUS PNEUMATICS

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . . Harvey S. Firestone

Chicago & Alton Waukesha Engined Versare-Westinghouse Bus and Chicago & Alton R. R. Deluxe Lincoln Limited

An Epoch Arrives

The Covered Wagon, the Iron Horse and the Electric Locomotive each have had their day. With the development of a suitable gasoline engine that can handle this 72-passenger, 30,000 pound (when loaded), eight wheel bus at fifty miles an hour, there comes a new era in transportation. Waukesha "Ricardo Head" six cylinders are the only standard production engines suitable for a high speed gas-electric bus of this speed and weight.

Write for information regarding these heavy duty vibrationless six cylinder engines, made in sizes varying from 70 H. P. for a high speed light bus or speed truck up to the 125 H. P. model used in the above C. & A. R. R. Versare-Westinghouse bus.

AUTOMOTIVE EQUIPMENT DIVISION

WAUKESHA MOTOR COMPANY

Waukesha Wisconsin

Eastern Sales Office Aeolian Building, 33 W. 42nd Street New York City

Builders of Heavy Duty Engines for Over Twenty Years

TIMKEN

In Detroit

— where the city's rapid growth has congested the streets with a terrific flow of traffic, the Detroit Motorbus Company operates 243 motor coaches — equipped with Timken Axles, front and rear.

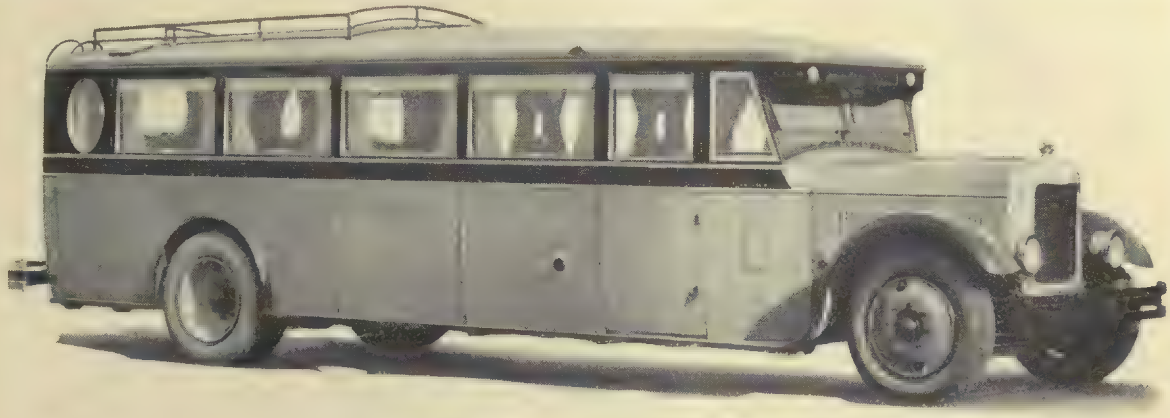
These vehicles are averaging 968,000 miles per month, and the operating company reports, "Axles are rendering extremely satisfactory service."

You are cordially invited to visit our exhibit at
the American Electric Railway Association's
Convention, Cleveland, October 4th to 8th, 1926

D T A CO

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

AXLES



Lang Bus Bodies
GLIDDEN-Finished

"It's every detail of the setting that counts"—that's the Lang Body Company's policy. Lang watches the details. It is significant, therefore, that Glidden Finishes have been chosen for the beautifying and protecting of Lang Bus Bodies.

RIPOLIN
TRADE MARK

The great beauty of Ripolin and its ability to withstand extreme wear and exposure are the outstanding reasons for its choice by Lang. Experience has shown that busses finished with Ripolin can be kept in operation for a much longer time than busses finished with ordinary materials. Furthermore, Ripolin is economical both from the standpoint of the superior covering capacity of the enamel itself, and the limited number of coats required to obtain the desired results.

* * *

GMF
GLIDDEN METALLIC FINISH

Glidden Metallic Finish is another Glidden product that is in standard use by Lang. It is a distinctive type of oil enamel which not only permits of a schedule as rapid as that of lacquer, but also spreads further per gallon, saves in the number of coats required, and saves in the rubbing and polishing operations. Its good qualities of adhesion and elasticity give the longest possible life to its exceptional beauty. Lang has proved the durability of G. M. F. by extensive usage of long-wheelbase bodies that are subjected to so much stress and strain on uneven road surfaces.

* * *

GLIDDEN MOTOR CAR Lacq

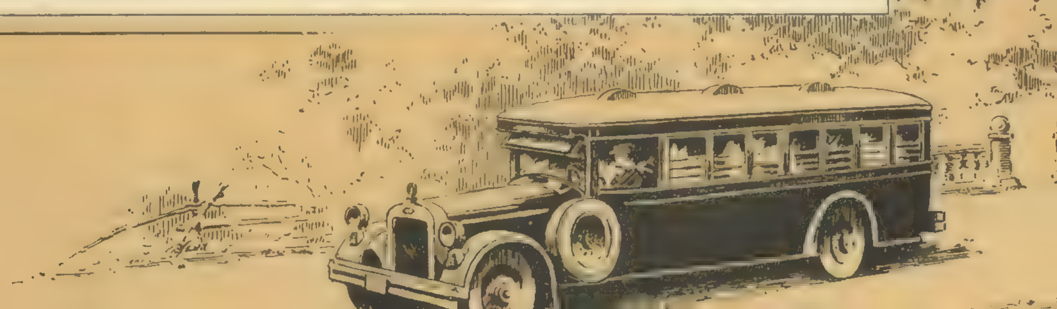
Where nitro-cellulose lacquers are used in Lang finishing operations, Glidden Motor Car Lacq insures long-lived beauty to the "setting". Lacq has been chosen, too, because of its remarkable durability, resistance to wear and weather, ease of cleaning, and the speed with which the various finishing coats may be applied—all qualities which point to ultimate economy.

Glidden at the A. E. R. A. Convention

Convention delegates are invited to visit Glidden Booth No. 338, where the complete systems of Glidden Street Car and Bus Finishes will be on display.

The Glidden Company, National Headquarters, Cleveland

"After all—
it's the Setting
that counts!"



After all it's the setting that counts!

Follow the badges to the Lang Body Exhibit Booth No. 337

Door Controls, Hinges, Seat Supports and Body Irons

are details that largely determine the life, comfort and appearance of any bus body.

For Instance

Ball Bearing Door Controls that open and close the door smoothly and silently.

Seats that utilize all the space to the best advantage and provide real comfort for the passenger.

Hinges that are strong enough to keep the heaviest door operating properly at all times.

Body Irons that form the very frame-work on which the body is built.

For nearly a half century Eberhard Malleables have kept pace in Quality and Design with every need of the body Builder.

THE EBERHARD MANUFACTURING
COMPANY
2734 Tennyson Road, Cleveland, Ohio

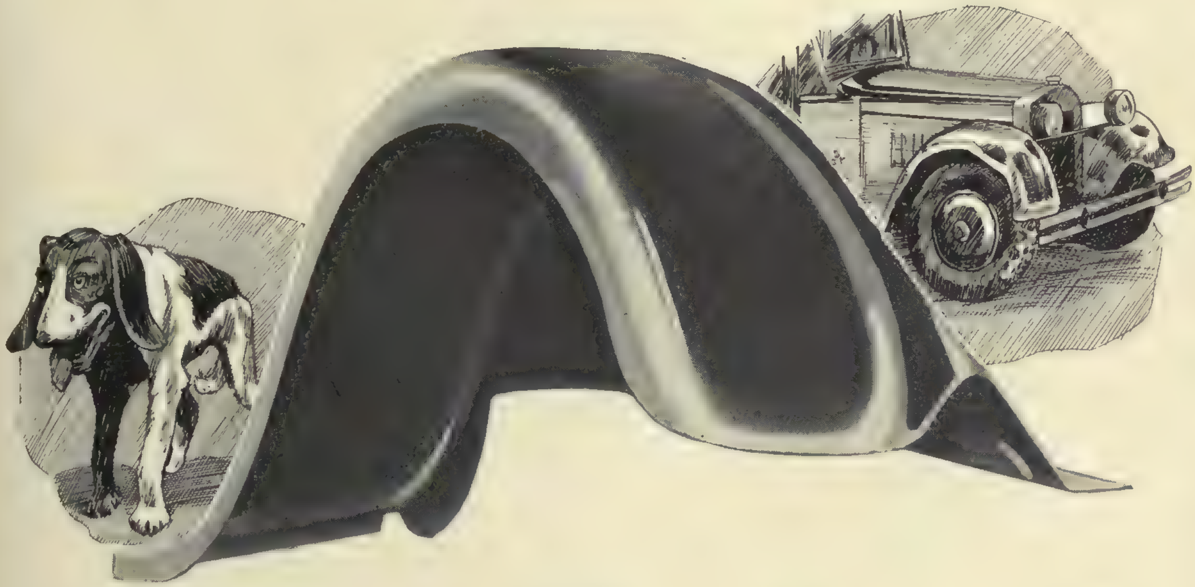
EBERHARD
MALLEABLES

48 Years of Quality & Service

Every detail of the setting cou
The Lang Body Company

After all it's the setting that counts!

Are Your Fenders "Dog Eared"



Then Try Rex

Dog eared fenders make a bus look old, unattractive quicker than almost anything else.

Yet fenders are out where the trouble begins. They get bumped, gouged, scraped and sidewiped. Unless you buy highest quality, it is difficult to keep them looking new.

Rex fenders stay new longer because they are sturdy enough to stand the gaff. Heavy metal, correctly placed for greatest strength, beautiful designs, quality workmanship.

As an integral part of "The Setting that Counts," Rex Fenders add a distinctive touch.

The Rex Metal Parts Company
1431 West 28th Street
CLEVELAND, OHIO

Follow the badges to the Lang Body Exhibit Booth No. 337

ery detail of the setting counts
The Lang Body Company

Half A Century Ago

Lang set the pace as builders of high quality carriages. The stately horse-drawn vehicles of that day, built by the old Rauch and Lang Carriage Company, were considered the highest examples of body building art.

Many perfected details have always kept **LANG BODIES** *up to date!*

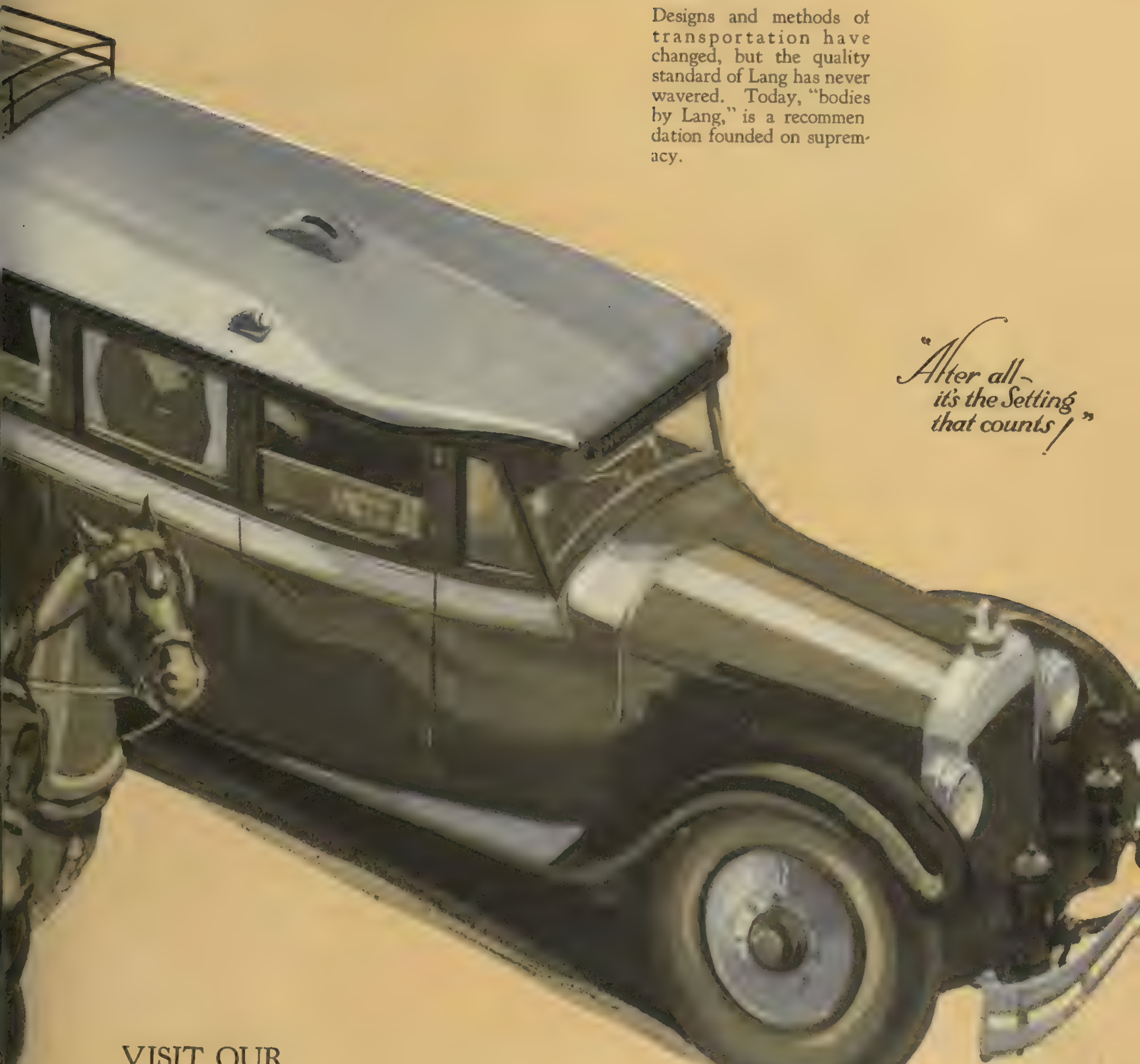
Keenly alert to every development in the bus industry, sensing the problems of the chassis manufacturer and keeping in mesh with the requirements of the riding public, Lang engineering foresight overlooks no details that contribute to quality and comfort.

Backed by years of experience, the progressiveness of the Lang organization is of pioneer character. It is because of unusual facilities and fearlessness in development research, coupled with minute attention to the perfection of details, that the name Lang stands for leadership in the building of fine quality motor coach bodies.

In 1926

Lang is still specializing on body building, establishing the standard for motor coach body design.

Designs and methods of transportation have changed, but the quality standard of Lang has never wavered. Today, "bodies by Lang," is a recommendation founded on supremacy.



"After all—it's the Setting that counts!"

VISIT OUR
EXHIBIT
BOOTH No. 337

LANG BODIES

create new passengers

After all it's the setting that counts!

Follow the badges to the Lang Body Exhibit Booth No. 337

Plate Glass Windows

Supplied by

M. RAWLE CO., Inc.

210-212 West 65th Street, New York

IMPORTERS OF

POLISHED PLATE GLASS

3/16 and 1/4 inch thick

FOR BUS BODIES and WINDSHIELDS

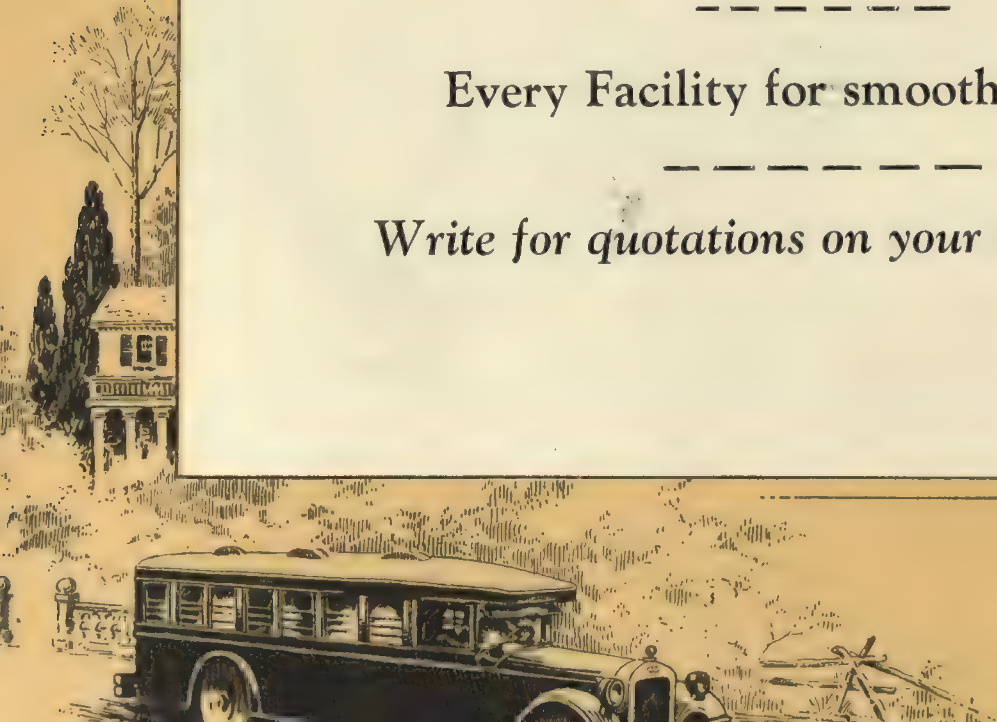
Also 3/16 inch

FLAT DRAWN GLASS

From Stock or Factory Shipments

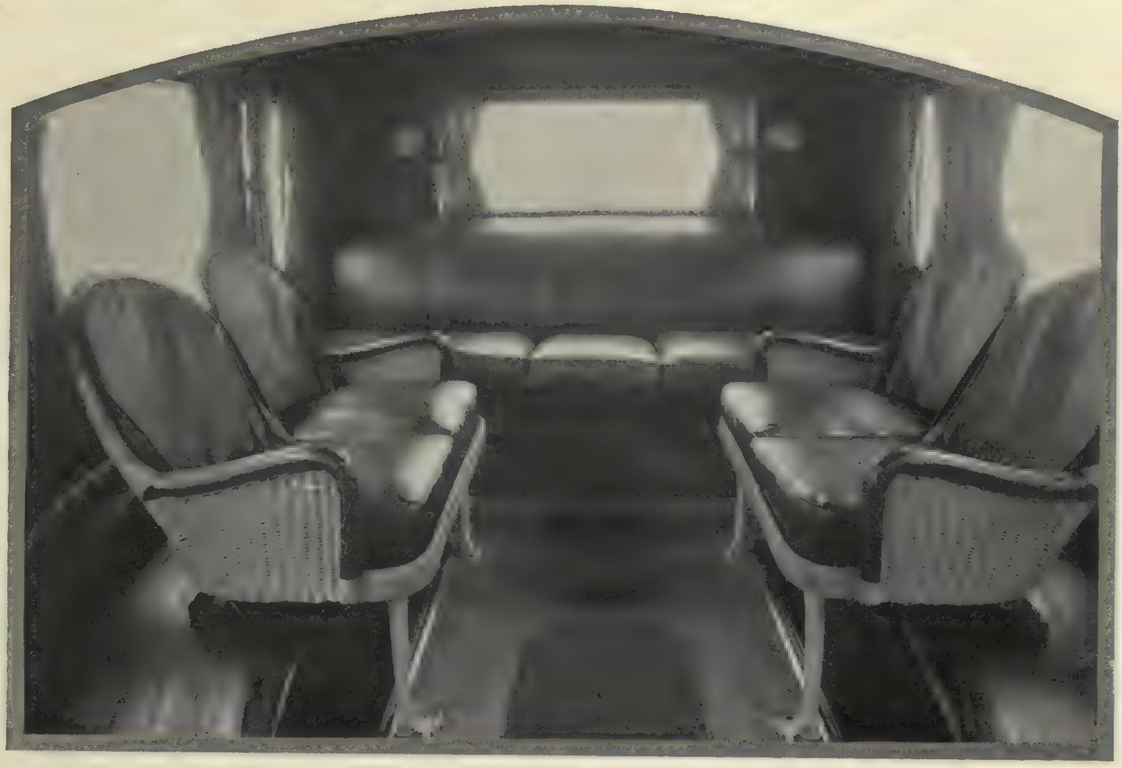
Every Facility for smoothing edges

Write for quotations on your requirements



Every detail of the setting counts
The Lang Body Company

After all it's the setting that counts!



HYALINE *helps create the "Setting that Counts"*

IN CREATING the setting that counts, Lang selected Hyaline (the Finest Coach Leather Obtainable) for the seat coverings. Real leather upholstery is richer looking, more comfortable, cleaner and will perpetually extend the invitation to enter throughout the life of the bus.

Hyaline will help you to sell transportation, reduce maintenance costs and simplify the problem of keeping your bus interiors looking their best. We offer complete hides or will cut them to pattern. Samples gladly sent.

Visit our exhibit at the A.E.R.A. convention.
Exhibit Space No. 235-A.

Hyaline Grains

Hand Buffs

Machine Buffs

Special Machine Buffs

Cleveland Tanning Co.

Dennison Avenue and Jennings Road, Cleveland, Ohio

WESTERN REPRESENTATIVE: Midgeley & Borrowdale
McCormick Building
Chicago, Ill.

EASTERN REPRESENTATIVE: L. D. Rockwell Co.
National City Building
New York, N. Y.

HYALINE

The Finest Coach Leather Obtainable

Follow the badges to the Lang Body Exhibit Booth No. 337

Every detail of the setting counts
The Lang Body Company

AERA
Cleveland Convention

Follow the badges to the Lang Body Exhibit Booth No. 337

Where appearances count and where durability's demanded better bus builders use

Textileather

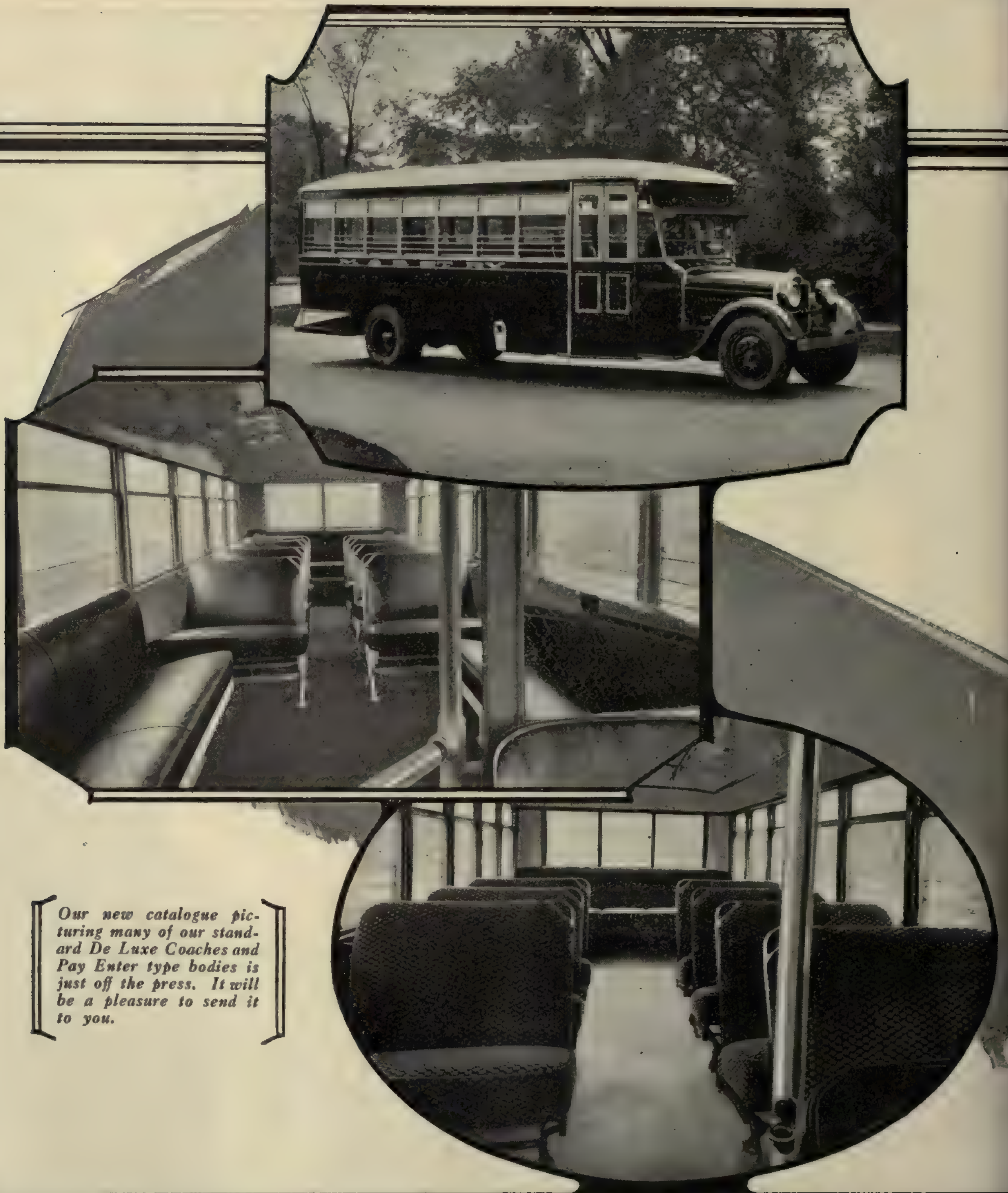
Qualities for decks, curtains, upholstery and interior trim. Samples gladly furnished.

TEXTILEATHER CO.
BROWN STREET AND
LISTER AVENUE
Newark, N.J.

"After all— it's the Setting that counts!"

Are You, Too, Listening to REO?

REO Exhibits at Cleveland Convention, Spaces 363-367



Our new catalogue picturing many of our standard De Luxe Coaches and Pay Enter type bodies is just off the press. It will be a pleasure to send it to you.

BENDER

Leadership

Is Never a Matter of Chance

BENDER'S Leadership in the building of bus bodies has been won because of certain very definite reasons.

First: the luxurious gracefulness of Bender Bodies attract attention and invite patronage.

Secondly: the seating arrangement, riding comfort and interior design wins the steady patronage of the traveler who once "tries out" this modern means of transportation.

That means a continually increasing patronage for the hundreds of operators who have selected Bender Bodies!

Coupled with this is the fact that as originators of bus bodies and de Luxe Coach designs, Bender has learned how to build bodies that stand the gruelling punishment to which buses are subjected.

That's why the maintenance cost on Bender Bodies is low!

Add to this the fact that sales leadership has brought the economies of tremendous buying power, great production and standardization in manufacture and you have the "Why" of the unequaled value offered in Bender Bodies.

THE BENDER BODY COMPANY, CLEVELAND, OHIO

BODIES

FISK

TRANSPORTATION
"Fillerless"
CORD TIRES

Time to Re-tire
Get a FISK
TRADE MARK REG. U. S. PAT. OFF.

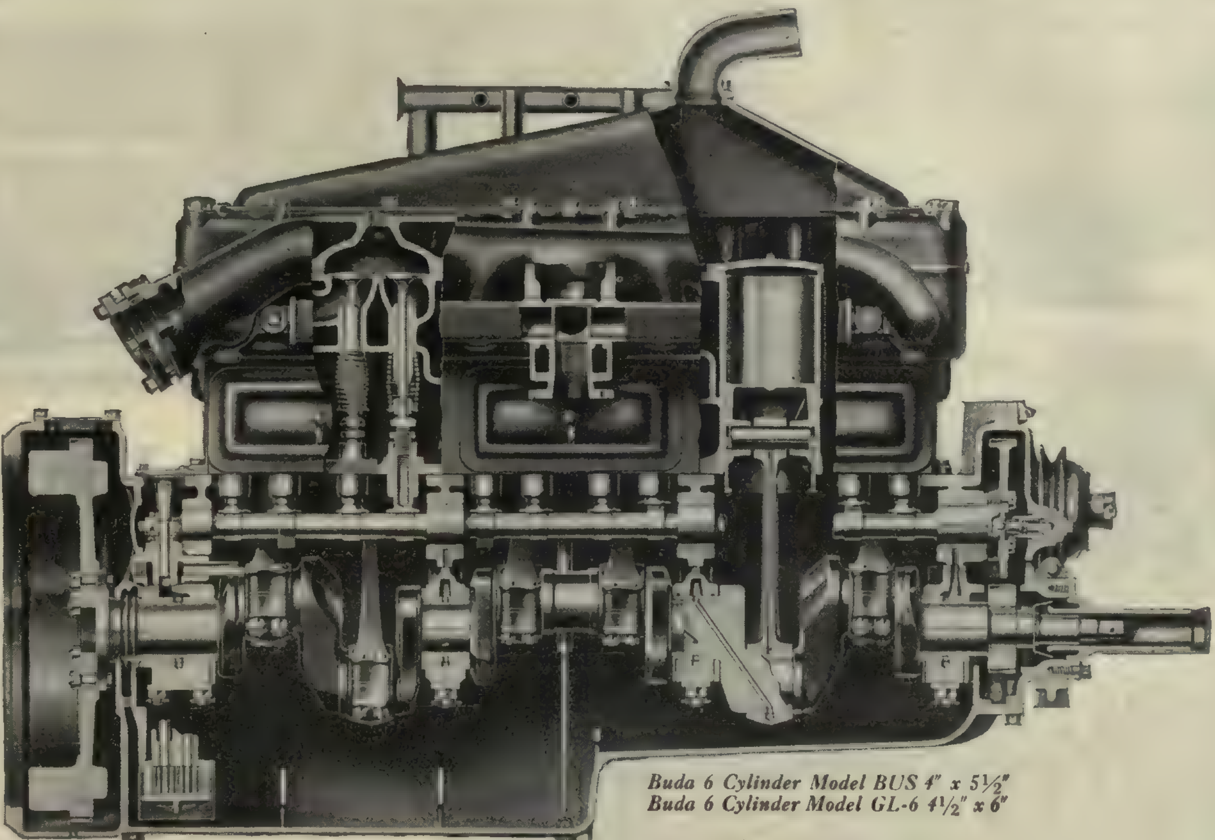
100 Per Cent Fisk

The following letter from Mr. Samuel Chase of the Interstate Motor Coach, Inc., Providence, R. I., is only further evidence that the leading coach companies of the country find it more profitable to narrow down their equipment to Fisk Transportation Cords:

> *"Our coaches operate on a schedule between Providence, R. I., and Worcester, Mass. Also between Providence, R. I., and Attleboro, Mass.*
>
> *"Your tires have proven very satisfactory to us, on a competitive basis against a number of other good tires of competitive makes.*
>
> *"The enclosed photograph will give you an idea of the type of coach which we have purchased for our service. It is our intention to standardize on your Transportation Cords 100% just as quickly as we can do so."*

Fisk Transportation "Fillerless" Cords
are made in all bus and truck sizes

The Fisk Tire Company, Inc.
Chicopee Falls, Mass.



Buda 6 Cylinder Model BUS 4" x 5½"
Buda 6 Cylinder Model GL-6 4½" x 6"

Economical Bus Power

You know that Bus profits are governed by the cost per mile and that engine performance is one of the main factors in holding costs down.

A Buda engine means profit to the bus owner because of its economical use of gasoline and oil combined with a minimum expense for maintenance.

Comfortable riding, which means more patrons, with increased revenue, is assured by the smooth and quiet operation of Buda six cylinder engines.

Models BUS and GL-6 were specially designed for motor coaches. Write for detailed specifications.

See the Buda Exhibit at the American Electric Railway Association Convention, Cleveland, October 4th to October 8th

THE BUDA COMPANY, HARVEY CHICAGO SUBURB ILLINOIS
ESTABLISHED 1881

Member of the Motor Truck Industries, Inc., of America

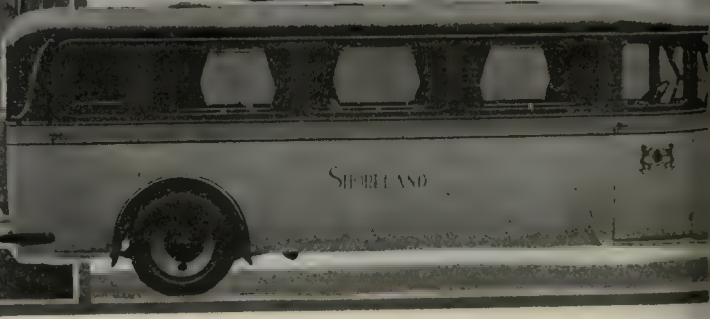
BUDA
AUTOMOTIVE
POWER

All Finishe

AND many of them finished in "all Egyptian." By which we mean that in addition to forty standard colored Egyptian Lacquer Enamels we also make lacquer undercoats—primer and filler.

All coats dry in one hour for additional coats—two hours for sanding, rubbing or polishing. Because of the extreme smoothness and natural lustre of Egyptian

The Egyptia
90 West Stre



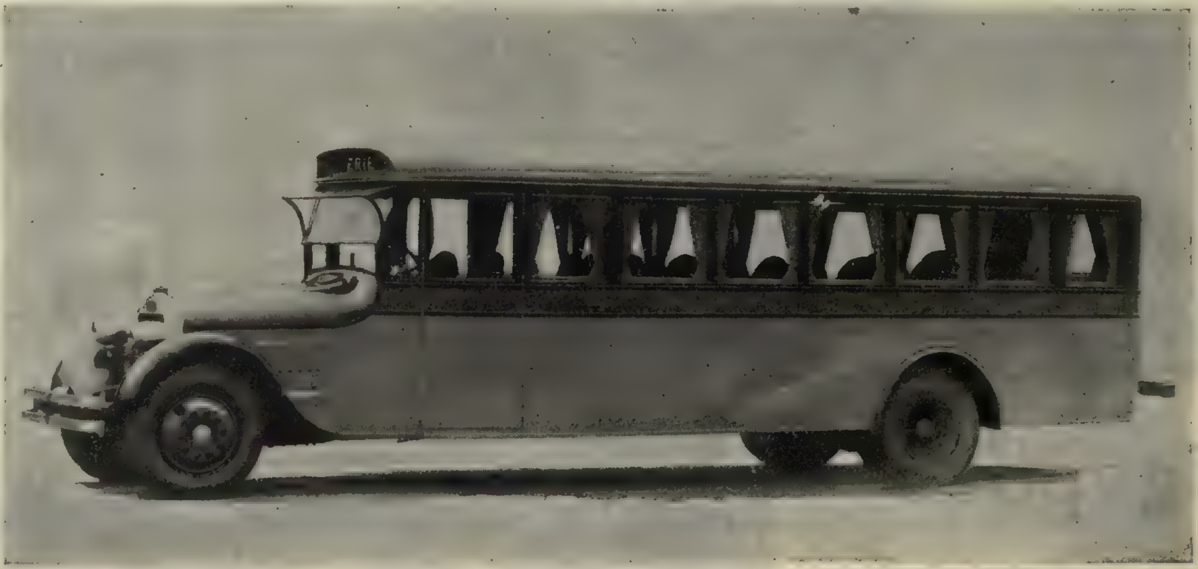
n Egyptian

Enamels, however, very little rubbing and polishing are necessary.

Our fifty years experience in lacquer making assures you of a product well beyond the experimental stage. Many automotive manufacturers are using Egyptian to advantage on their entire production.

May we tell you who they are?

acquer Mfg. Co.
ew York



Bus Bodies that *Promote Public Popularity*

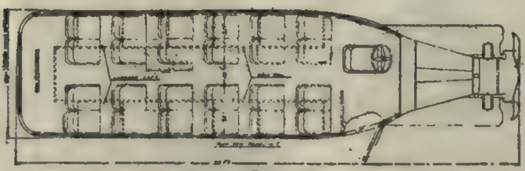
FOR revenue-producing bus operation, careful drivers are important, well-arranged schedules are necessities, terminal facilities count. But important as these are, they can never build gross receipts without passenger comfort, and they can never build net profit without economical operation.

The far-sighted operators who realize that truth will be interested in the contributions Baker-Raulang Bus Bodies are making to passenger comfort and operating profit.

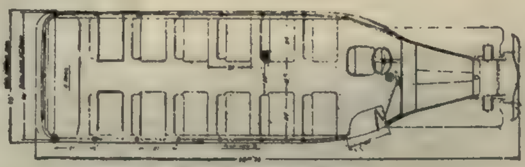
Baker-Raulang bus bodies have wide aisles, roomy seats, comfortable leg room. In summer there is thorough ventilation from front and roof ventilators and easy-sliding rattle-proof windows, in winter there is evenly distributed heat from concealed pipes. Steps are easy and safe. There is ample headroom for standees or passengers going to and from seats. In every detail there is *riding comfort* that will make one-time passengers steady riders and build gross receipts.

In addition, 73 years of body building experience has added sturdiness, low maintenance cost, economical operation to these bodies, and that builds net profits.

Baker-Raulang Bus Bodies are made in the City Pay-Enter type for short hauls, the Parlor Chair type for long hauls (with the new Baker-Raulang Luggage Loft that adds five paying seats) and in other types to suit special needs. We will be glad to send further details that will be of particular interest to large bus transportation companies.



Parlor Chair Type



City Pay-Enter Type

THE BAKER-RAULANG COMPANY • *Bus Body Division* • CLEVELAND, OHIO

Baker
Raulang
Bus Bodies

There is a

YELLOW COACH

designed and built
for
every type of
transportation
service

YELLOW KNIGHT

The completeness of the Yellow Coach line, developed as the result of actual transportation experience and deep insight into all phases of modern operation, assures that the proper type of motor coach is available to meet every individual transportation requirement. The various models of Yellow Coaches which are everywhere successfully solving transportation problems are shown on the pages which follow.

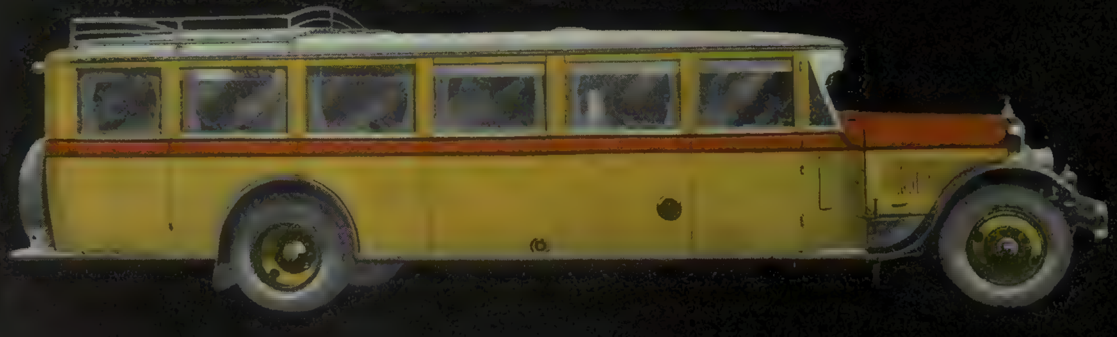
YELLOW KNIGHT

Type Y Parlor Coach

(25-30 Passengers)

Beauty, comfort, safety and all-around dependability combine to make Type Y America's outstanding parlor coach. Especially designed throughout for high speed interurban service, its low hung construction and long wheelbase assure roadability, safety and easy riding.

Unsurpassed in operating economy and powered by our 6-cylinder Yellow Knight Sleeve Valve Engine which develops 105 actual horsepower. Improved four-wheel air brakes and balloon tires are standard equipment.



YELLOW KNIGHT

Type Z City Service Coach

(29 Passengers)

Back of Type Z design stands billions of miles of successful operation over many years in the principal cities of America. Dependable performance, high earning power, attractiveness for passengers and low operating costs are its outstanding characteristics.

Type Z carries 29 seated passengers and has generous aisle space so that even standees ride in comfort. It is equipped with our powerful 6-cylinder Yellow Knight Sleeve Valve Engine.

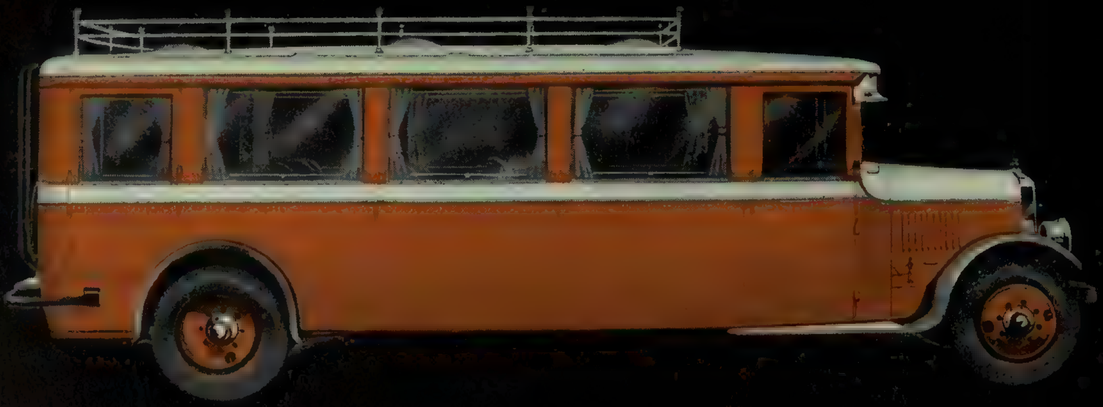
YELLOW KNIGHT

Type X Parlor Coach

(17 to 21 Passengers)

A high-grade medium capacity inter-city parlor coach of beautiful lines and especially sturdy construction. Mass weight has been eliminated in favor of high-grade selected materials in both body and chassis, assuring long life and reducing operating and maintenance costs to a minimum.

Exceptionally smooth riding qualities coupled with its interior and exterior beauty attracts and holds patronage. Chassis is equipped with four-wheel hydraulic brakes and balloon tires and powered by our economical 6-cylinder Yellow Knight Sleeve Valve Engine.



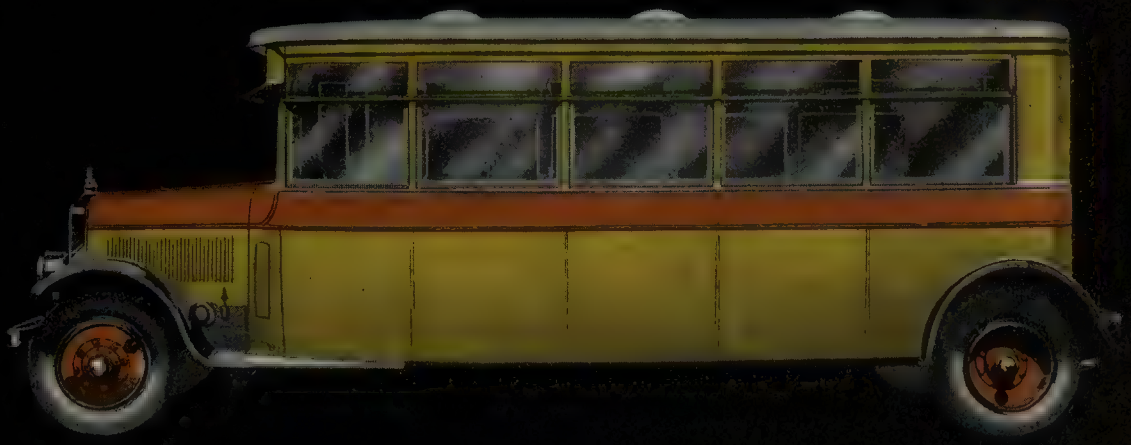
YELLOW KNIGHT

Type X City Service Coach

(21 Passengers)

A sturdily built, light weight pay-enter coach designed for service on routes where load requirements do not justify a larger vehicle, or where frequency of service is in demand.

Passengers all ride facing forward in roomy, comfortable seats, wheel-arch interference being eliminated by special construction. Four-wheel hydraulic brakes assure safety and ease of control, while the 6-cylinder Yellow Knight Sleeve Valve Engine provides smooth and quiet power. Balloon tires are standard equipment.



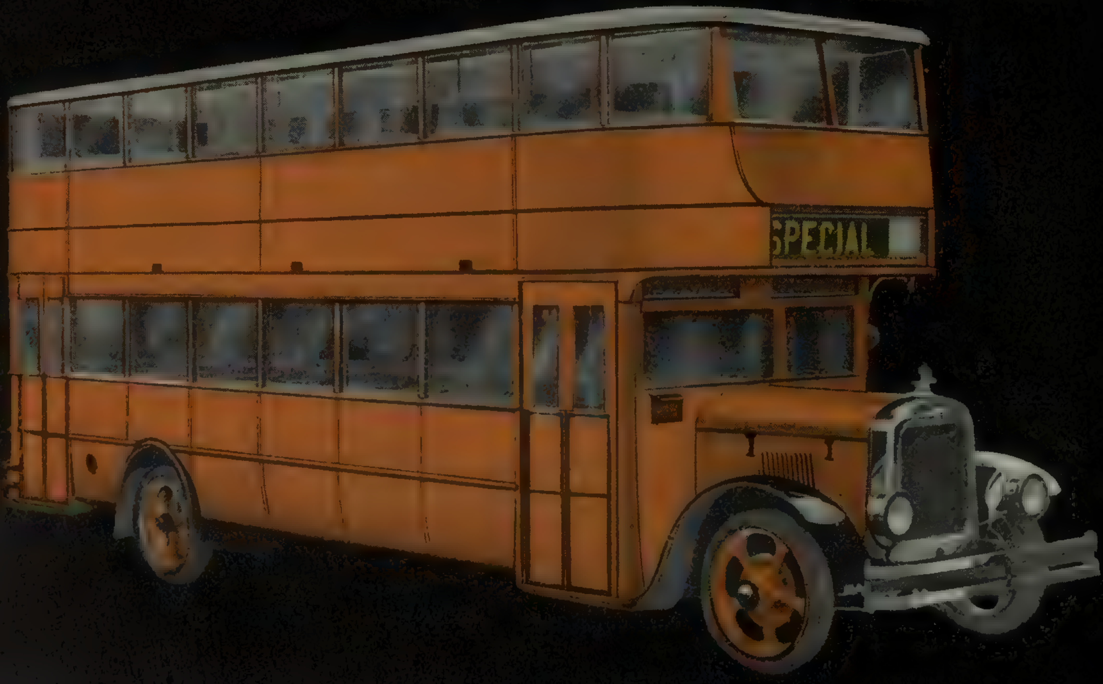
YELLOW KNIGHT

Type Z Gas-Electric Coaches

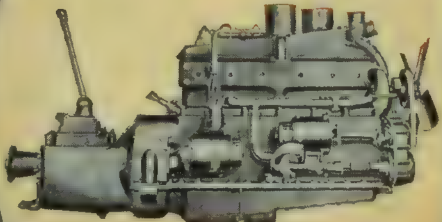
(33 to 67 Passengers)

The Type Z Gas-Electric coach is designed primarily for city operation, affording rapid and smooth acceleration, simplified driving control, long service life, comfort and safety for passengers. The single deck gas-electric seats thirty-three passengers; the doubledeck, semi-enclosed, sixty-seven.

Incorporated in the gas-electric design are the proven General Electric motors and generator, driven by our 105 horsepower Yellow Knight Sleeve Valve Engine. The final drive is of the powerful dual worm type.

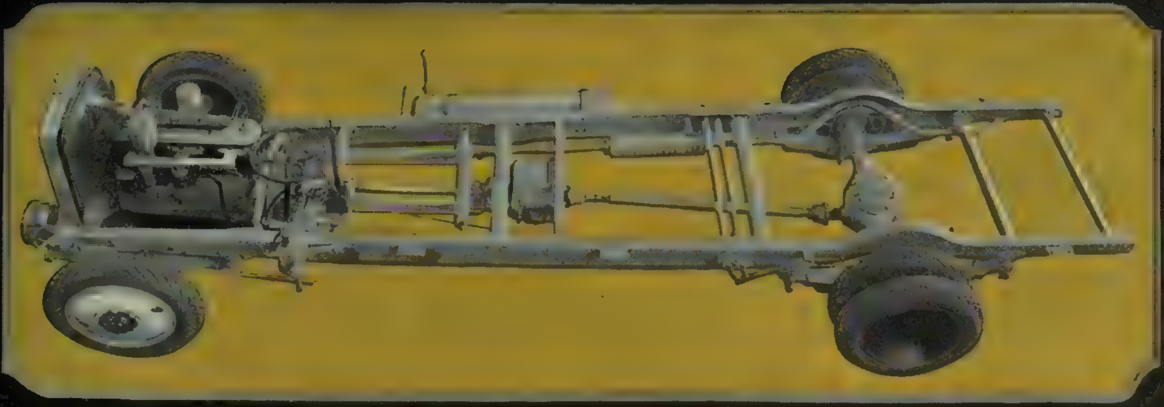


YELLOW KNIGHT



We are the only motor coach manufacturers using the powerful, quiet and economical 6-cylinder Yellow Knight Sleeve Valve Engine. The elimination of many working parts and the simplicity of its construction results in exceptionally low operating and maintenance costs.

The strongest, most rigid frame construction ever devised, involving the use of tubular cross members, is found in all Yellow Coaches. Advanced brake design; progressive springs; dependable, proven clutch units; special forged rear axle housings; efficient steering mechanism and unsurpassed engine performance are other Yellow Coach characteristics. Below is shown one of the seven distinct types of Yellow Coach chassis available to fit each and every operating condition.



—BUT THAT'S NOT ALL

Visit the Yellow Coach Exhibit
at the Cleveland Convention

The right coach to fit your service *plus* the right units *plus*—

Entirely satisfactory performance and protection of initial investment are not complete unless financial stability be added.

Behind each type of Yellow Coach, and behind the functioning and service rendered by each part, stand the welded organizations of Yellow Coach and General Motors. These two great institutions, linked together for greater service and financial strength, add to operating equipment and initial investment a security which offers unparalleled protection over future years.

Look behind the equipment you buy. Analyze the responsibility of the company with whom you conduct business. Weigh its financial strength and the attitude of your bankers toward the protection and earning possibilities afforded by proven equipment having such splendid backing. It is on these factors that Yellow Coach stands supreme.

The right coach to fit your service. Plus the right units. *Plus financial stability.*

YELLOW TRUCK & COACH MFG. CO.

SUBSIDIARY GENERAL MOTORS CORPORATION

5801 WEST DICKENS AVENUE, CHICAGO, ILL.

Over 10,000,000
Miles on Generals
since September, 1922

After 10,000,000 miles of bus and coach service in four years' time, officials of the Penn-Ohio System certainly ought to know which tire travels the most miles, with fewest interruptions, at lowest cost. Here is what Mr. R. N. Graham, of the Penn-Ohio System, wrote on August 31, 1926:

> "Since September, 1922, the Penn-Ohio System has operated over ten million bus and coach miles on General Tires.
>
> "The Penn-Ohio service has been remarkably free from interruptions of any kind or character. We feel that a great deal of the credit for our trustworthy schedules is due to the sturdy quality built into the tires on our great fleet of busses and coaches.
>
> "As long as Generals are built to the present standard, they will continue to be an integral part of Penn-Ohio service."

Bus fleet operators everywhere are standardizing on Generals because carefully kept records prove beyond all argument that The General Tire does out-travel all competitors; that its lower rolling-resistance assures a substantial yearly saving in power and gasoline consumption; that 100% General equipment means the lowest possible tire cost per mile—the lowest possible cost of operation.

The Mark of Leading Tire Stores Everywhere

The
GENERAL
TIRE

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.

Which makes the better buy?

Two men, let us say, set out to buy bus bodies.

One, thinking wholly of price, shops from one body builder to another, stressing the need for shaving prices and speeding up deliveries.

The other, knowing that the bus bodies he buys will be the only transportation salesmen he can hire, heads straight for Anheuser-Busch.

To men who have been building finest vehicles for more than forty years, he tells the story of what he hopes to accomplish in his own limited field of transportation.

Briefly, he outlines the transportation conditions that exist in the locality where he plans to operate—the size of that locality—the kind of service he plans to provide—long haul, short haul, cross-town or cross-country.

He gets the advice and counsel of those men—valuable because it is the crystallized result of years of intimate experience with transportation problems. He gets bus bodies built to multiply his profits as the months and years roll by because those bodies are designed and built with a clear conception of what they must do—win and hold new riders.

He gets bodies as comfortable to ride in as those on the big busses of the St. Louis Bus Company, which daily carry capacity loads in royal comfort thru the dense traffic of that large metropolitan city.

And as sturdy as that Anheuser-Busch body on the bus operated by Community Motor Bus Company, of Belleville, Illinois, which was only slightly damaged, though it sped head-on into a telegraph pole on Fourth Street near the Free Bridge in St. Louis.

Before you buy a single bus body, or a fleet of them, think of these two men. Think of all those extra advantages the second buyer gets that the first doesn't even think about. And ask yourself—"Which makes the better buy?"

There is an interesting booklet which tells more about Anheuser-Busch Bus Bodies, and the service Anheuser-Busch is prepared to offer the bus operator. We shall be glad to send you a copy with our compliments on request. Address the Vehicle Department, Anheuser-Busch, St. Louis.

VEHICLE DEPARTMENT, ANHEUSER-BUSCH, ST. LOUIS

Anheuser-Busch Bus Bodies

INTERIOR MODERNIZATION of Cars Pays

At the A.E.R.A. convention you will see the strides that have been made in enhancing the interior appearance of cars and busses. Interiors are now made luxurious and comfortable—for comfort and luxury help build revenue.

Nothing can take the place of leather for seat coverings. Hyaline (the Finest Coach Leather Obtainable) will outwear any other covering. It reduces maintenance costs and simplifies the problem of keeping interiors looking their best.

Hyaline and Alpha Grains are the ultimate in high class leathers. We also offer several other grades and finishes. Samples gladly sent.

Visit our exhibit at the A.E.R.A. Convention
Space No. 235-A

- Hyaline Grains
- Hand Buffs
- Machine Buffs
- Special Machine Buffs

Western Representatives:
Midgeley & Borrowdale
McCormick Building
Chicago, Ill.

Eastern Representatives:
L. D. Rockwell Co.
National City Building
New York City

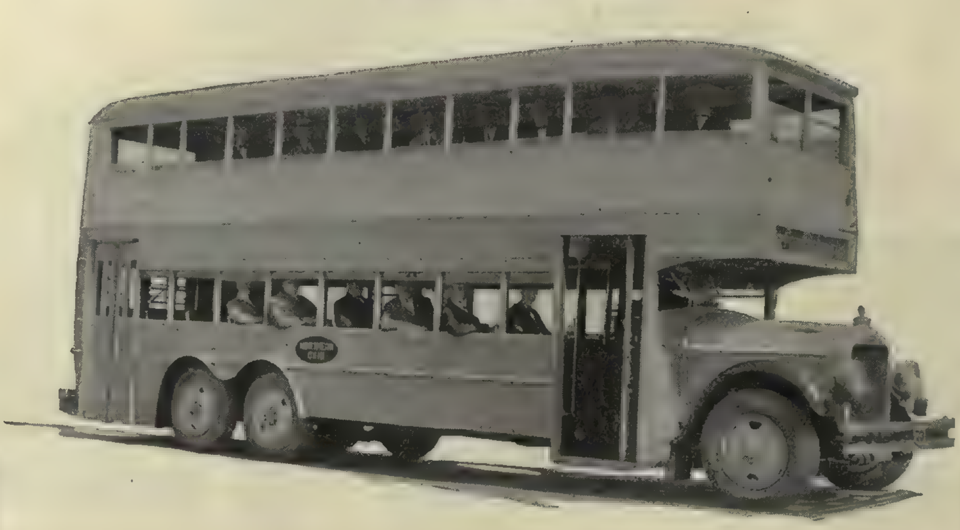
Cleveland Tanning Co.
Dennison Ave. & Jennings Rd.
Cleveland, Ohio

HYALINE

The Finest Coach Leather Obtainable

SATISFACTION HOOVER DURABILITY

SPECIALIZED BODIES



At the A. E. R. A. Convention

The New Hoover Double Deck

AT THE American Electric Railway Convention will be exhibited the latest type body available in double deck construction.

Your attention is especially called to the full head room on both upper and lower decks and that the upper deck is fully enclosed. This feature eliminates the loss of revenue in weather when passengers will not ride on the open or semi-enclosed type top deck.

Examine the many features incorporated for the comfort of passengers that are new and will assist greatly in building and keeping public good will.

The excellent coach finish of the interior is particularly striking, placing this phase of bus transportation on a new and higher plane.

Our representatives at the convention will be glad to give you full information concerning this equipment, also data on any other type in our varied line.

HOOVER BODY COMPANY
YORK PENNSYLVANIA

Eastern Sales Branch, Long Island City, N. Y.

HOOVER
Specialized
BODIES

THE AUTO BODY COMPANY

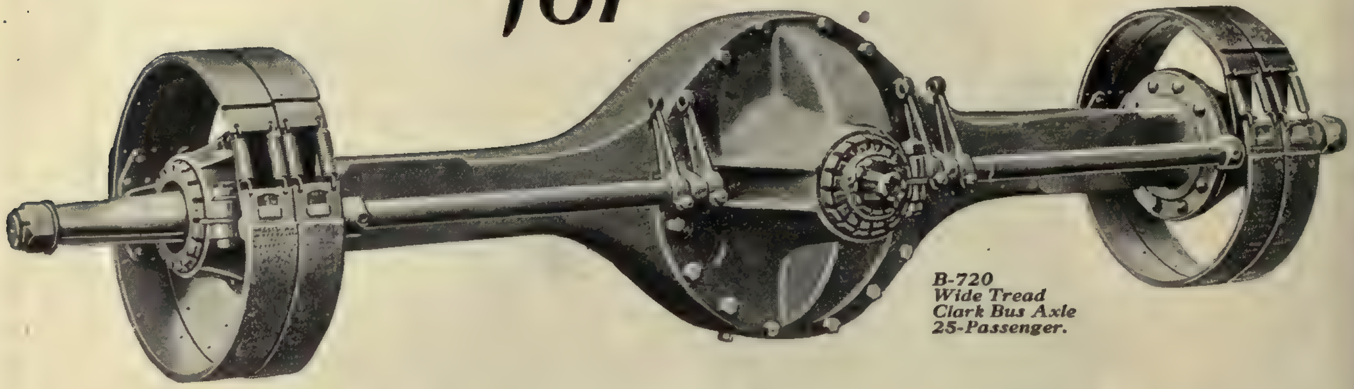
LANSING, MICHIGAN

Designers and Manufacturers of Motor Coach and Bus Bodies
Open and Enclosed Automobile Bodies

"Jagged Rocks"
Yellowstone National
Park

THE Butler-Marantette Touring Boys Camp of Ann Arbor, Michigan, touring Yellowstone National Park this summer, using Studebaker Bus and Reo Speed Wagon both equipped with Gibraltar Bodies.

CLARK
AXLES
for



*B-720
Wide Tread
Clark Bus Axle
25-Passenger.*

MOTOR BUSES

High speed with greatest efficiency is possible for heavy duty buses built with Clark spiral bevel drive axles—*single reduction.*

Buses up to 25-passenger capacity may be handled with safety when built with Clark wide tread axles.

These axles possess the following essential and distinctive features: straddle mounted pinions with load carried between two annular ball bearings; dual wheel bearings, adding security and service; double compensating internal brakes providing maximum safety with ease of replacement; cast steel, high carbon, air-cooled brake drums; electric steel main axle housing—specially heat treated.

*Exhibiting at
American Electric Railway
Association,
Cleveland, Ohio,
October 4-8, 1926.
Space No. 429.*

CLARK EQUIPMENT COMPANY
BUCHANAN, MICH.

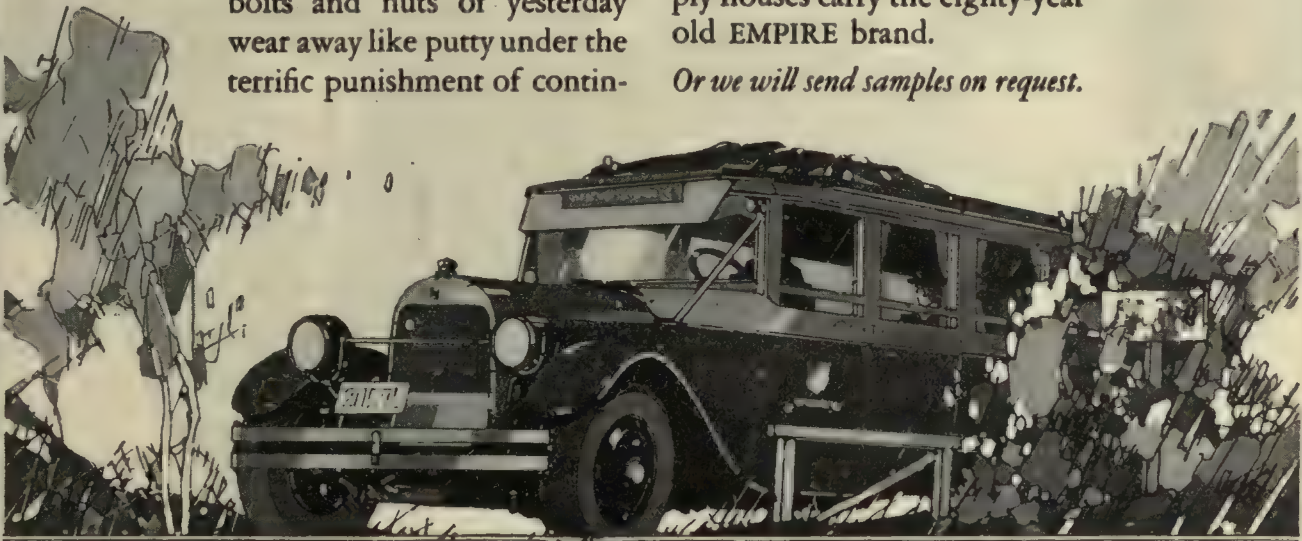
Member Motor Truck Industries, Inc.

EMPIRE BOLTS & NUTS

BUS transportation has developed a new problem in maintenance—*the rapid wear of parts that in ordinary automotive service were good enough.* The "good enough" bolts and nuts of yesterday wear away like putty under the terrific punishment of continuous high speed bus service. Specify EMPIRE Bolts and Nuts in all your shops. The difference in overhaul time will interest you.

All good jobbers and mill supply houses carry the eighty-year old EMPIRE brand.

Or we will send samples on request.



PRECISION OF FIT

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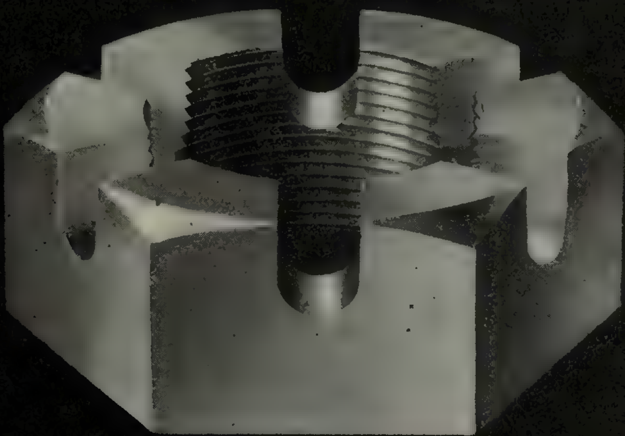
STRENGTH OF THREAD



ACCURACY OF FINISH

•

PERFECT HEX

BOLTS EMPIRE NUTS·RIVETS

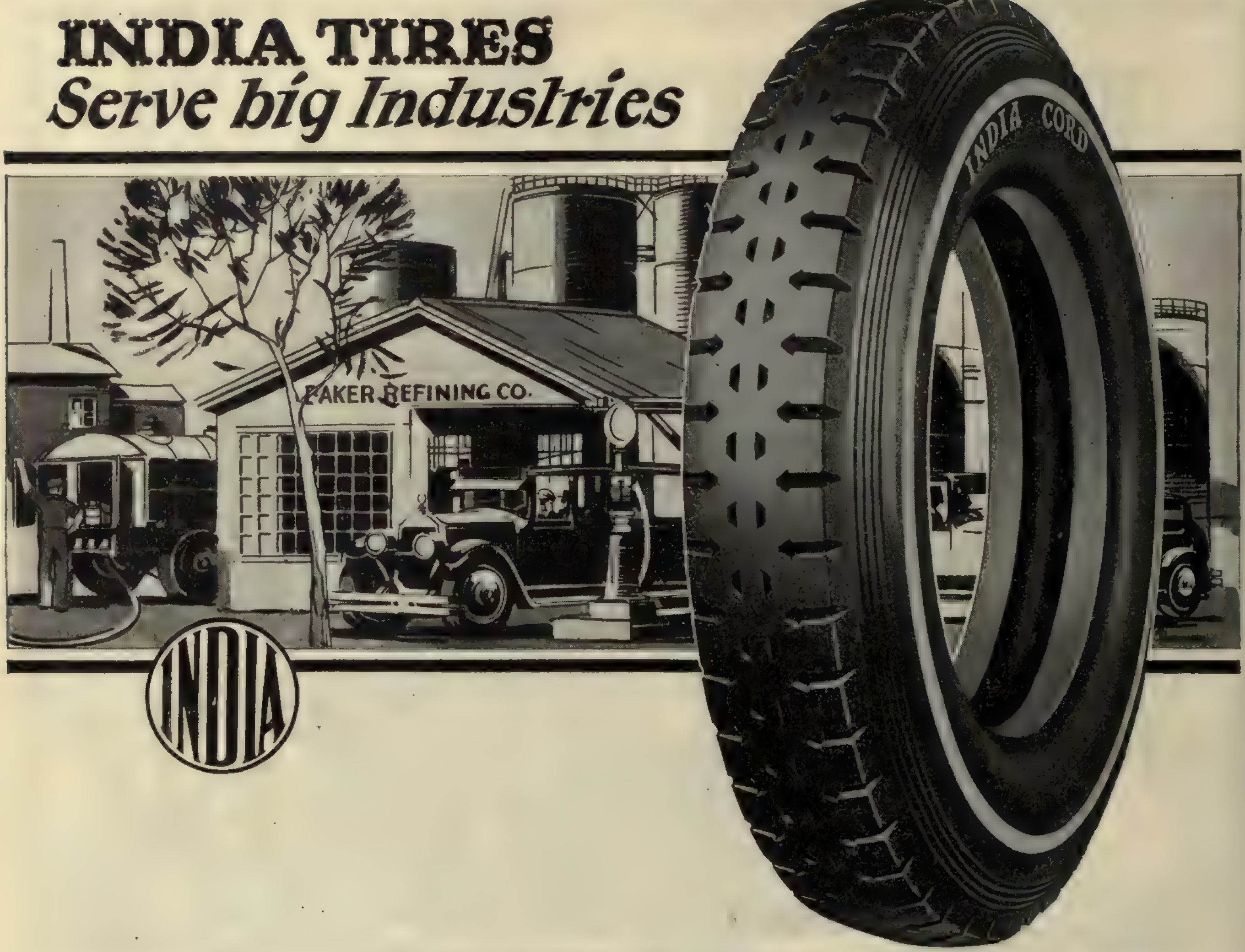
RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
PORT CHESTER, N.Y.

Branch Office: Straus Building **CHICAGO**
Branch Office: General Motors Bldg. **DETROIT**
Branch Factory: **ROCK FALLS, Ills.**
Strimple & Gillette 169 Jackson Street **SEATTLE**
Maydwell & Hartzell, Inc. 158-168 Eleventh Street **SAN FRANCISCO**

[illegible]

BOLTS EMPIRE NUTS·RIVETS

INDIA TIRES
Serve big Industries



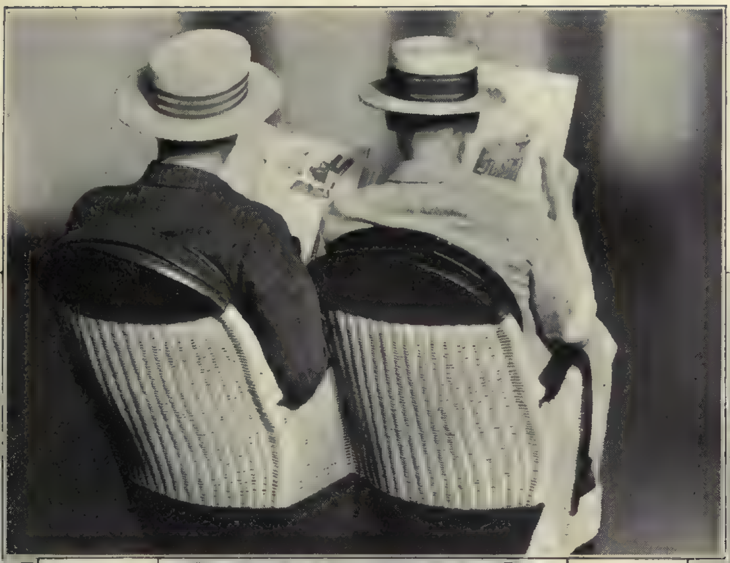
The more tires you use—the more you can save by using INDIAS.

Whether it is two tires per year or two hundred—on heavy delivery trucks, your own or salesmen's cars—the superior quality of material and method of construction of INDIA Tires assure you the utmost *uninterrupted* mileage you can buy.

Just put an INDIA alongside any tire you are using. Let it run—in heavy service or light, and you'll see the difference.

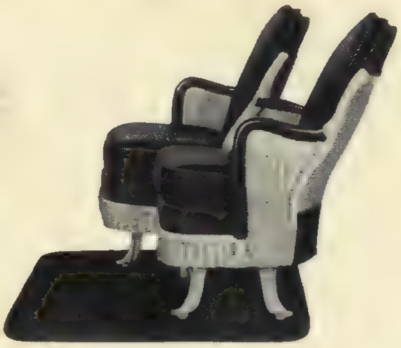
INDIA TIRES

INDIA TIRE & RUBBER CO., AKRON, OHIO.



The "overlap" of shoulders in the Karpen "Staggard" Seat gives several inches extra room, and permits fully as much comfort and privacy as two individual seats.

Two average-sized men have a rather uncomfortable time of it in an ordinary double seat, as is apparent in the view above.

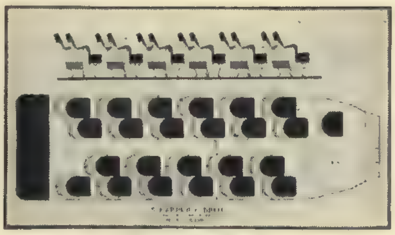


Now you can see the advantage of Karpen "Staggard" Seats

The Karpen "Staggard" Seating method is the only arrangement which gives the comfort and privacy so much appreciated by bus riders, without reducing the seating capacity of the bus. Overlapping the shoulders of the two passengers not only furnishes greater comfort than is possible with an ordinary double chair, but a "Staggard" Seat occupies less actual space. Four inches are added to the aisle width, and, what is more important, the alternate placing of seats along the aisle gives a still greater usable aisle space than with opposite placing.

The floor plan below makes this point clear.

Karpen's experience of over thirty years in building deluxe seating for America's finest railroad service and careful study of bus operation have made possible the Karpen "Staggard" Seat.



(Patents Pending)

Remember that all Karpen coach chairs are built of *indestructible fiber*, with steel reinforcement in every upright stake, and genuine leather seats, cushions and backs. Climate and temperature have no effect on such construction. For quality and comfort in transportation seating always go to Karpen.

Karpen

KARPEN Guaranteed Construction FURNITURE

FURNITURE

S. KARPEN & BROS.

General Offices, 636-678 West 22nd Street

CHICAGO

New York Salesroom
37th Street and Broadway

Chicago Salesroom
801-811 So. Wabash Avenue

San Francisco Salesroom
180 New Montgomery Street

Rugged Busses

Exceptional Performance on Gruelling Mountain Roads Proves Surplus Stamina of Studebaker Busses

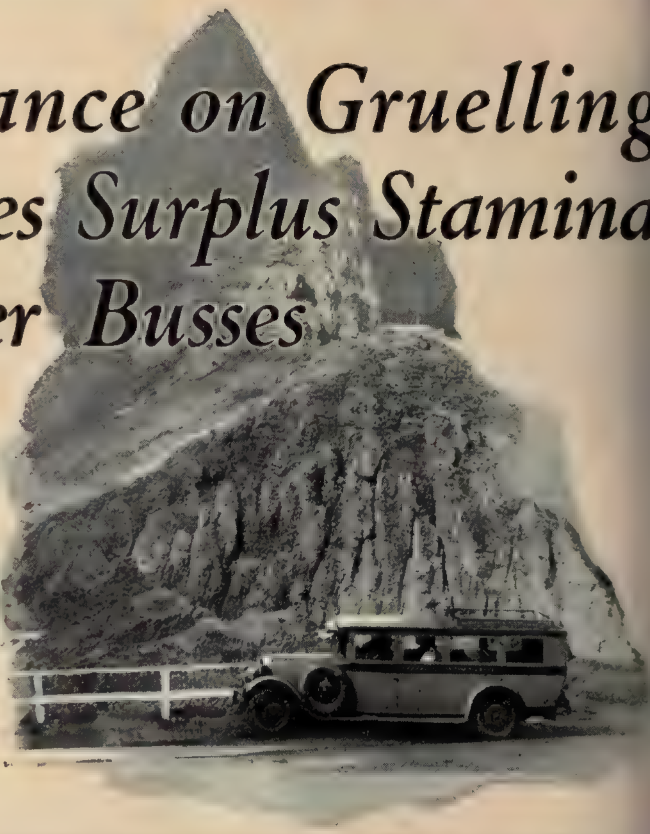
WHERE grades are steep and roads are rough, and service is miles away, operators are turning to Studebaker Busses to handle heavy schedules at a profit.

Routes abandoned by other busses have been reclaimed by Studebakers, and trails that were never attempted are trails where Studebaker has triumphed. On tough mountain runs from coast to coast Studebaker Busses have written a record of extreme dependability.

Consider the operating problem of the Interstate Transit Co., whose busses travel 750 miles over two mountain ranges between San Francisco and Portland, Oregon. Elimination tests gave Studebakers this strenuous run. "Two of our busses are way past the 20,000-mile mark and not once has a motor stopped or a car failed to show up on schedule. These cars average 358 miles per day every day, bucking snow on nearly every trip. You can tell the world we are more than satisfied."

The H. C. Chase Co. of Missoula, Montana, know what mountain roads do to equipment. They also know what Studebaker Busses do in lowering mountain operating costs: "Gas will make 12½ miles per gallon over 7 to 19 per cent grades, 4 miles long. Mechanical expense averages $1.00 per thousand miles. You can always depend on Studebakers for mud, rough roads or hills."

Routes that proved disastrous to other operators were taken over by the Red Star Transportation Co. of Lexington, Kentucky. "Some of the grades reach as high as 22½ per cent. Though several of our Studebaker jobs are close to 100,000 miles no major unit has ever been replaced. Experience with various other equipment has convinced us that we would have to abandon some of these runs if we could not get Studebaker Busses."



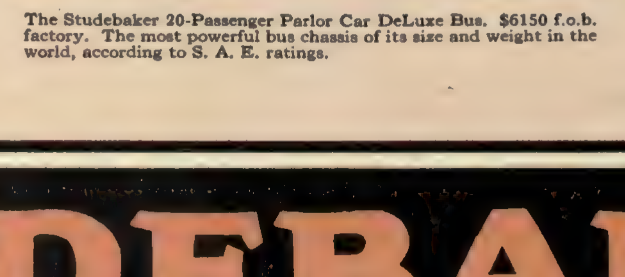
Studebaker Busses operate daily over the gruelling grades between Honolulu and Waimana, Hawaii. At one point the road rises more than 1500 feet in 2½ miles. The Studebaker Bus is admirably adapted to climbing tasks since it is the most powerful bus chassis of its size in the world.

Hundreds of letters tell the same story of Studebaker's extraordinary performance under difficult conditions. This evidence offers convincing proof of the exceptional ability of Studebaker Busses to pile up profits even where working conditions are worst.

–first cost
–operating cost
–maintenance cost
–depreciation cost
Lower

More than 1200 satisfied operators have driven Studebaker Busses over one hundred million profitable miles—and every mile has added to Studebaker's reputation for dependable, economical transportation. Studebaker's low first cost, low operating cost and mountain-tested endurance have fattened the profits of operators in every state in the Union.

Your route may not run through the Rockies, with heavy grades and drifted snow and raw country roads ahead of every bus that leaves the terminal. But the same excess endurance and high economy that make Studebaker a moneymaker under these adverse conditions will cut your costs and jump your profits on any route you are operating today.

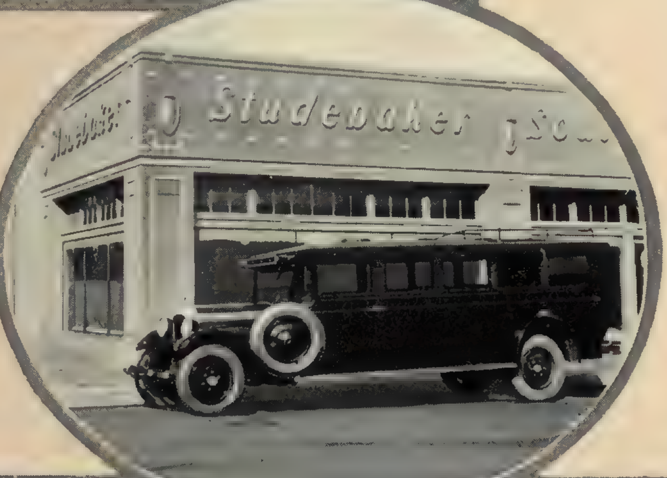


The Studebaker 20-Passenger Parlor Car DeLuxe Bus. $6150 f.o.b. factory. The most powerful bus chassis of its size and weight in the world, according to S. A. E. ratings.

STUDEBAKER

for Rocky Routes

(*Left*) The H. C. Chase Co. of Missoula, Mont., operate Studebaker Busses through the Rockies. They write: "Gas makes 12½ miles per gallon over 7 to 19 per cent grades, 4 miles long. Mechanical expense averages $1.00 per thousand miles. You can always depend on Studebakers for mud, rough roads or hills."



ight) The H-K Truck es, Las Cruces, New exico, have driven idebaker Busses more in half a million miles er rough desert routes. /e cannot speak too hly of the rugged dendability and enorous power of the idebaker Bus. Though operate under the seest conditions possible have averaged over % schedule time for last two years."

These Studebaker Busses operated by the Interstate Transit Co. of San Francisco average 358 miles per day, over two mountain ranges between San Francisco and Portland, Ore. The operators report: "We hardly believe Studebaker service could be improved. Not once has a motor stopped or a car failed to show up on schedule."

The Brewster Transportation Co., who operate passenger cars and busses through the Canadian National Park, Banff, Alberta, use 36 Studebakers. Studebaker Busses were chosen for this hard service after the Brewster Co. had thoroughly tested every make of car suitable for heavy mountain operation.

x Body Designs, 12 to 21 Passengers, $3935 to $6150

rices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal udget Payment Plan—Small down payment and balance in convenient monthly installments.

Pass. (including driver) cross-seat Sedan-Type	$3935
Pass. (including driver) cross-seat Sedan-Type	$4295
Pass. (including driver) cross-seat Sedan Type	$5050
2 Pass. Pay-As-You-Enter Street-Car Type*	$5125
Pass. (including driver) side-entrance Parlor Car	$5300
2 Pass. (including driver) Parlor-Car De Luxe*	$6150

*Includes dual rear wheels

THE STUDEBAKER CORPORATION OF AMERICA,
Dept. B South Bend, Ind.

Send me full information on Studebaker Busses without obligation

Name..

Address..

City..................................State..................

We have.........................busses at present.

Check below the Studebaker Bus about which you desire information.

Type: Sedan.........Parlor Car.........Street-Car Type............

Capacity:..........................Passengers.

BUSSES MORE PROFIT PER

WISCONSIN AXLES are standard on many of America's finest coaches. Their selection, recently, by one of the largest manufacturer-operators in the street railway field is additional evidence of their superiority.

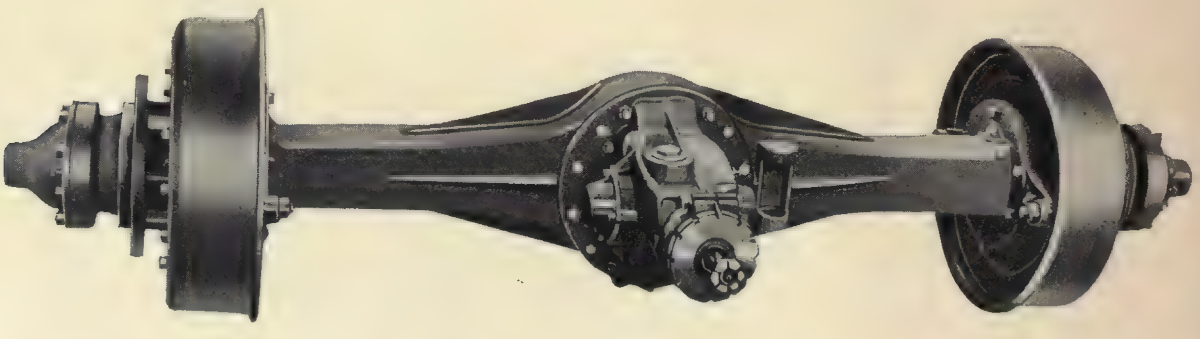
Wisconsin design insures low upkeep cost, minimum time loss—profitable operation.

Four separate over-size brakes provide absolute safety in emergency.

Unusually large ground clearance makes operation possible through heavy snow and over difficult detours. Other essential features include one-piece housing, drop forged steel differential cases, nickel steel differential internal parts and triple heat treated shafts.

A complete line of Wisconsin Axles is available for busses seating from fifteen to sixty passengers with a range of gear ratios to meet every operating condition.

Double Concentric Brake Construction Provides Greatest Possible Brake Areas



WISCONSIN AXLES

Spiral Bevel—Double Reduction—Worm—Semifloating or Fullfloating

Wisconsin Parts Company - Oshkosh, Wis.

The Circulating Load for the Bus, also

Modernize the bus, also!

FRONT entrance and rear exit facilities expedite passenger interchange and avoid congestion. THE CIRCULATING LOAD is essential for efficient bus operation.

National Pneumatic Automatic Treadle Door device makes this feasible for the bus, without sacrificing economy of one-man operation. The passenger about to alight at the rear end opens the door himself by stepping on the built-in treadle. Safety interlocking absolutely prevents door from opening until bus has stopped. Conversely, the bus cannot be started until door has closed itself.

See this equipment at the A. E. R. A. Convention
Convince yourself of its advantages.

Exhibit Space 107-109-111

NP

NATIONAL PNEUMATIC COMPANY
Executive Office, 50 Church Street, New York
General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

Nine years ago

Nine years ago a group of men designed and built a Six Wheel truck which carried loads of five tons and upwards from Coast to Coast and over a million miles of city streets and country roads.

For six succeeding years numerous other Six Wheeled vehicles were built and tested until the design met the ideals of the builders.

These pioneers visioned the day when Six Wheeled Coaches would give to millions of riders:

Greater Riding Comfort—

Safety—

with brakes on four rear wheels,
by the standardized use of air brakes,
by freedom from skids,
with wider and lower frames and axles.

Faster Travel—

with six cylinder engines,
by the use of pneumatic tires.

A Feeling of Luxury and Security—

by reason of well designed bodies, seats and interior decorations.

SAFEWAY

—and Today—

Cleveland and the nearby city of Akron operate nearly 100 SAFEWAY Six Wheel Coaches, both single and double-deck. Detroit has 140—Kansas City—Pittsburgh—Cincinnati, etc., etc., have made this vision a reality.

Today the organization which pioneered the SAFEWAY Six Wheel Coach gratefully acknowledges the endorsement and tribute of the leaders of transportation.

The permanence of the adoption of Six Wheel Motor Coaches is now assured.

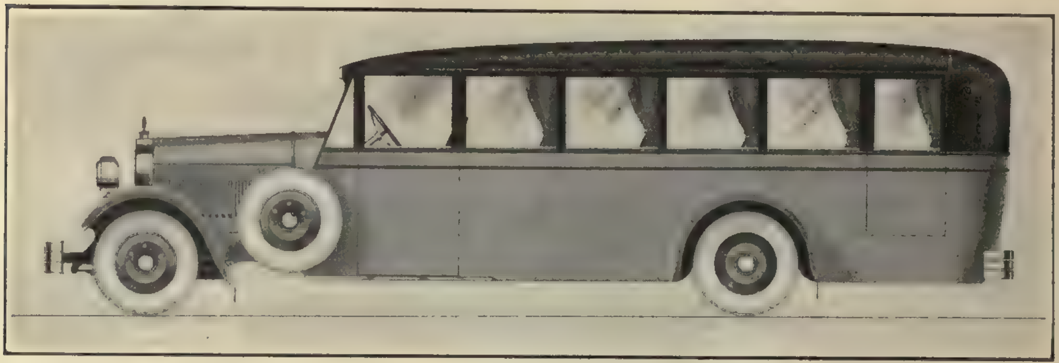
This organization pledges itself to place the Motor Coach on the high plane of efficiency and reliability which has made the electric and steam units the pride of the transportation industry.

An exhibition of all models will be shown in
Spaces
342, 343, 344, 345, 346, 347
in the Cleveland Convention

THE SAFEWAY SIX-WHEELER

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.
Manufacturers of De Luxe, City, and Double Deck Type Six-Wheel Coaches

Arrived at Cleveland!



Here's the job we want you to see—one of the finest coach jobs, we believe, ever turned out. We ask you to see it and judge for yourself.

A visit to Space No. 411-418 at the convention will convince you of the extraordinary grace of line, luxurious comfort, and master craftsman workmanship of Farnham-Nelson coaches. This applies to both stock and custom built models.

If you are looking for coach bodies with just those refinements of line and finish and just those little extra touches of comfort and originality which make people want to ride—visit and consult us.

The Farnham-Nelson Company

18-22 Arboretum Road *Mastercraftsmen of Custom Coach Work* Roslindale, Mass.

VULCAN STEEL WHEEL

A new type of Wheel for Buses Constructed to:

★1—Assure Cool Tires.
2—Provide the Lightest Yet Strongest Wheel in Use.
3—Do Away With All Loose Parts.
4—Simplify Mounting and Dismounting.

★ *This unique Self-Cooling feature is particularly interesting.*

STEEL WHEELS, INCORPORATED
Avenue L and Edward Street, Newark, N. J.

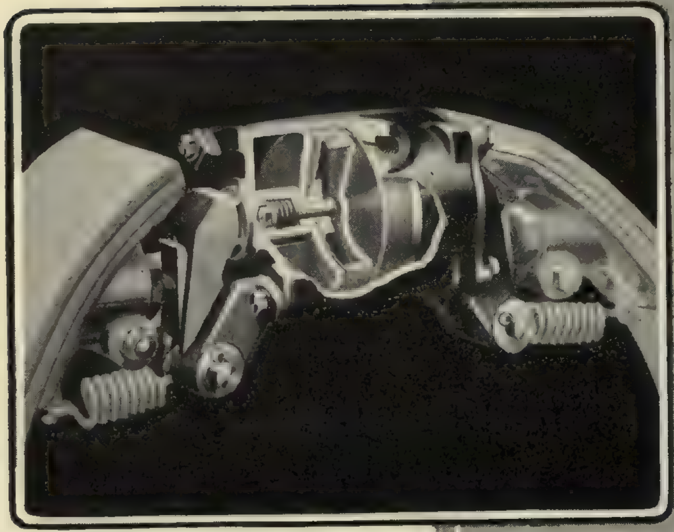
Changing Brakes from th
to the Mos

BRAKES are right generally acknowledged as being the most troublesome and least reliable operating part of the modern bus. This is not only unfortunate, it is *unnecessary*.

This state of affairs has focused attention upon brakes and it is reasonable to suppose that within a comparatively short time the better class of buses will have incorporated into their chassis, brakes that rank with the most reliable operating parts of a bus and that require vastly less attention and maintenance than is now necessary.

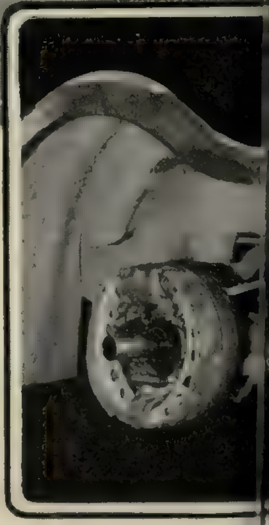
Christensen Air Brakes will do this to a degree unequalled by any other. The front-end mounted compressor directly driven from the engine crankshaft — without using gears, chains, belts, auxiliary shafts, or universals; the brake cylinders inside the wheels, eliminat-

Christensen Ai
6513 Cedar Av



Sectional view of Christensen Brake Cylinder showing Sealtite all-metal pistons and 2 to 1 power levers.

Sealtite all-metal brake piston assembled.



Christensen Air Brakes on Safeway Six Wheel Bus showing rigid shoe construction and 2 to 1 power levers. In the service of the Cleveland Railway Co.

east Reliable
eliable Part of the Bus

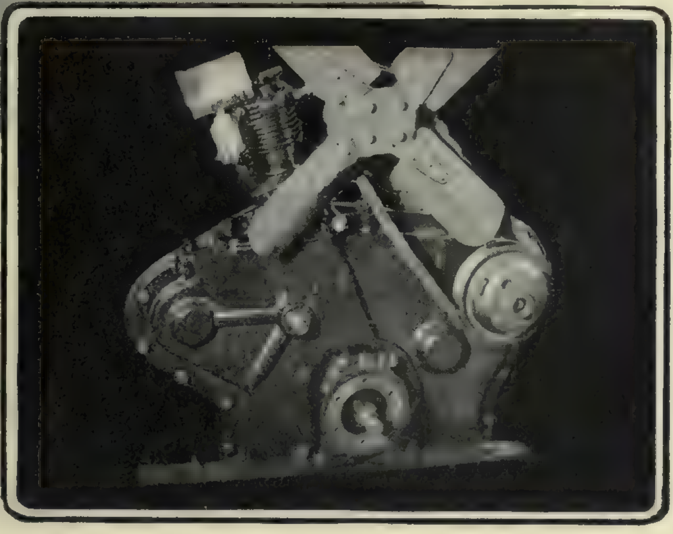
ing all service brake rigging on the chassis—pull rods, levers, cables, cams, and mechanical equalizers — inherently self-equalizing and fitted with Sealtite pistons, constitute the simplest and most effective brake available.

The self-equalizing feature and the Sealtite all-metal brake cylinder pistons—impervious to the effect of oil vapor and brake heat—make adjustments to the brake unnecessary from the time the brakes are originally set up until the liners are completely worn out. And the very design of the brake shoes seems to prolong the life of the liners.

Make sure that the brakes you get on the buses you buy are those which will give you the lowest per mile operating cost and the most effective control—Specify "Christensen Air Brakes."

Christensen Compressor and governor mounted on front end gear case cover plate of Continental 14H engine, driven direct from an eccentric on engine crankshaft. Installed on Six-Wheel Double-Decker used by Cleveland Railway Co.

rake Company
leveland, Ohio



Christensen Compressor and governor mounted on front end gear case cover plate of Buda model GL6 engine, driven direct from an eccentric on engine crankshaft.

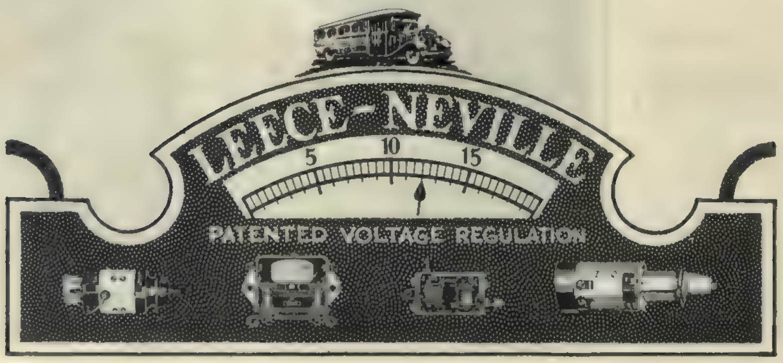
The steady brilliance of quality

Brilliant, steady, flickerless—the lighting of Cleveland buses demonstrates the high quality illumination service rendered by Leece-Neville Patented Voltage Regulation.

The ready start from a vim-full, healthy battery—records of battery life twice, thrice and four times as long as ordinary—cost sheets showing infrequent and uncostly maintenance on the electrical side—are evidence of unseen but equally important service of Leece-Neville Patented Voltage Regulation.

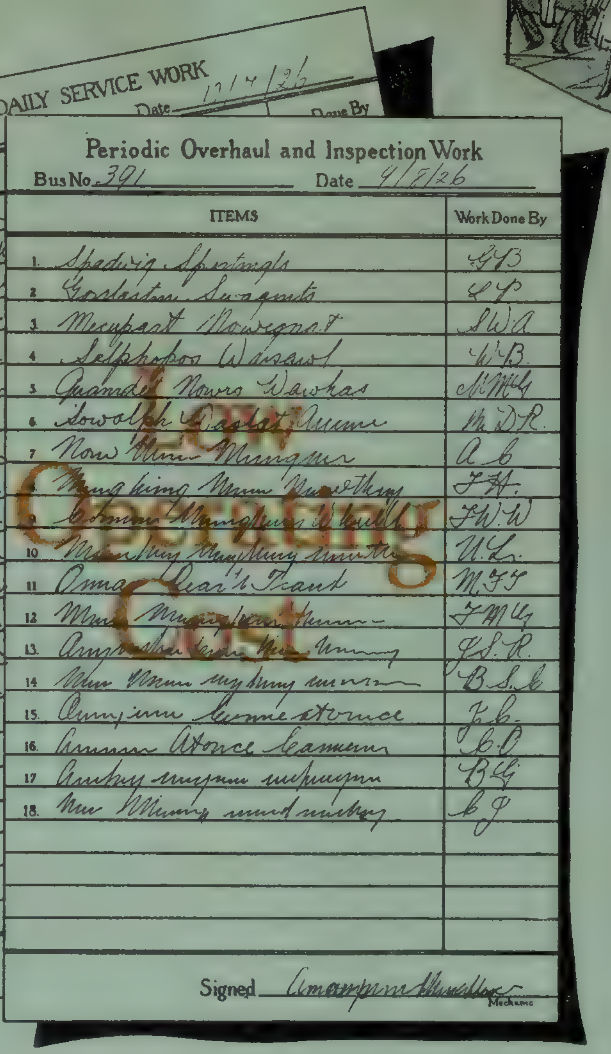
Leece-Neville Patented Voltage regulated generators are the cure of most electrical troubles. Small wonder so many buses have it.

The Leece-Neville Company
Cleveland, Ohio



This Coach Will Haul Fewer Empty Seats

Rider Appeal



Low Operating Cost

DAILY SERVICE WORK
Date 12/7/26
Done By
Bus No. 618

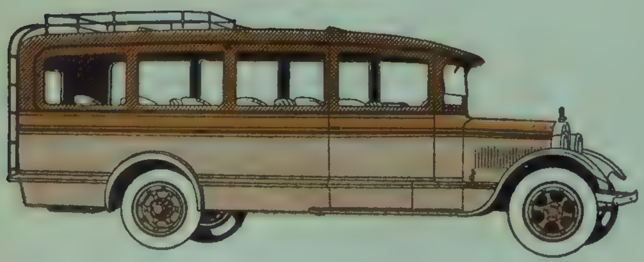
Periodic Overhaul and Inspection Work
Bus No. 391 Date 4/8/26

	ITEMS	Work Done By
1.	[illegible]	G.H.B.
2.	[illegible]	E.P.
3.	[illegible]	S.W.A.
4.	[illegible]	W.B.
5.	[illegible]	M.M.G.
6.	[illegible]	M.D.R.
7.	[illegible]	A.B.
8.	[illegible]	F.H.
9.	[illegible]	F.W.W.
10.	[illegible]	U.L.
11.	[illegible]	M.T.T.
12.	[illegible]	F.M.G.
13.	[illegible]	J.S.R.
14.	[illegible]	B.S.B.
15.	[illegible]	J.B.
16.	[illegible]	C.C.
17.	[illegible]	B.G.
18.	[illegible]	C.J.

Signed [illegible]
Mechanic

The 12-Passenger Parlor Coach provides a quick, safe, comfortable ride in interurban service or on city runs where a high speed de luxe service can be rendered. So attractive it invites patronage. Economical and dependable.

Complete $3750
f.o.b. Detroit



GRAHAM BROTHERS

SOLD BY DODGE BROTHERS

Frequent Service

GRAHAM Brothers Motor Coaches give street railway operators a flexibility in schedule-building that makes possible better service to the public—and greater earnings for the operator.

The 21-passenger street car type is recognized as the unit of greatest utility. It can be profitably operated when traffic is light, and its low cost makes possible the operation of more units to take care of traffic peaks.

Huge production makes initial cost low. Skillful design makes operating cost low. Rugged construction, which has made Graham Brothers dependability an accepted fact, keeps maintenance cost low.

With the consequent low expense per trip, operators can give more frequent service with Graham Brothers Motor Coaches.

There is invitation in their appearance and that assurance of comfort and safety that fosters the coach-riding habit.

Street Car Type, Complete, $3815, f.o.b. Detroit

MOTOR COACHES

EALERS EVERYWHERE

A TWO TON TRUCK TRIUMPH

Graham Brothers new Two-Ton Truck has fairly astounded those who have tried it out—and learned its low price! Simply another reflection of Graham Brothers policy of passing on to the buyer the vast economies of mass production.

Largest exclusive truck manufacturers in the world, Graham Brothers are in a logical position to produce trucks of outstanding performance ability at unapproachably low prices.

They did it with the famous One-Ton G-Boy. And now again with this sturdy Two-Ton.

Now you can standardize your equipment on Graham Brothers—a model for every need.

Graham Brothers Trucks, with Dodge Brothers ¾-Ton Commercial Cars, meet 91% of all hauling requirements.

2-TON CHASSIS - - - - -	$1445
(Disc Wheels With Dual Rear, Optional)	
1½-TON CHASSIS - - - - -	1245
1-TON CHASSIS (G-BOY) - -	885

f. o. b. Detroit

GRAHAM BROTHERS
Evansville — DETROIT — Stockton
A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED—TORONTO, ONTARIO

The American Brake Shoe & Foundry Company

Announces the
incorporation of the

American Brake Materials Corporation

which will manufacture and distribute a friction element of a new and radically different principle for buses and other automotive vehicles to be known as

AMERICAN
BRAKEBLOKS

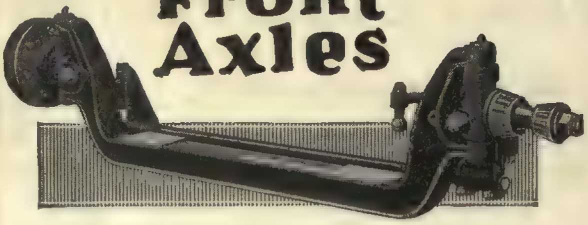
AMERICAN BRAKEBLOKS are the result of intensive experiments and severe service tests with foot and power brakes. They have the following specific advantages:—

1. **Friction equal to any new fabric liner, and this friction remains constant throughout the entire life.**
2. **Smaller contact area needed, leaving greater radiation area to dissipate heat.**
3. **Durability so far in excess of fabric liners, that brake wear becomes an unimportant factor.**
4. **No metallic content whatsoever. Drums will not be scored or cut.**
5. **Can be attached or detached readily, by unskilled labor, without removing brake shoe from the assembly.**
6. **No riveting required—attached to the shoe with solid bolts.**
7. **Unaffected by water, oil or grease.**
8. **Cannot burn, smoke, or squeal.**
9. **Will not grab.**

Complete details of AMERICAN BRAKEBLOKS will be available at the American Electric Railway Association Convention at Cleveland, October 4-8, where they will be exhibited in Booths Nos. 274, 275, 287 and 288.

American Brake Materials Corporation
30 Church Street, New York City

Shuler
Front
Axles



For Motor Buses

Busses
and
Pullmans

Pullmans are constructed to years of service and safety. Busses must also give years of service and utmost safety. We are doing our part by manufacturing FRONT AXLES ONLY. Building in quality that will endure.

Shuler Axle Co.
INCORPORATED
LOUISVILLE, KY.

Member of Motor Truck Industries, Inc., of America

PANTASOTE
Trade Mark
Seat and Curtain Materials
There is no substitute for Pantasote

AGASOTE
Trade Mark
Roofing—Headlining—Wainscoting
The only homogeneous panel board

standard
for electric railway cars
and motor buses

Used and Surplus Equipment

INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

This is the section which so effectively aided the Government in selling the many millions of dollars worth of surplus material and equipment accumulated during the war without disturbing the market.

"SEARCHLIGHT"

Sidestepping Maintenance

In designing this bus chassis, we went after old man maintenance in a new way.

Instead of trying to improve the things that cause most maintenance trouble, (thereby risking making them worse) we just eliminated them.

Clutch, transmission, brakes, starter—all the things which show up most frequently on maintenance sheets, simply can't be found on this chassis.

The Waukesha motor specially designed for us is connected to an ingenious, yet simple electrical control. This control combines the functions of starter, clutch, gear shift, brakes and flywheel.

All control except the accelerator is at the steering wheel. Acceleration is smooth and steady with no interruption of power through declutching. There is no grinding and clashing of gears. Pickup is remarkably quick. Braking, accomplished in the electrical control (except for separate emergency and parking brake) is powerful and perfectly equalized. Reverse is quick and easy.

The engine and radiator are resiliently mounted on a separate frame, which may be quickly unlocked. Then the whole power plant slides forward out of the chassis, greatly simplifying repairs.

Radiator core is quickly demountable for repairs or replacement.

De Jon and Robert Bosch Ignition systems. Although construction is exceptionally sturdy, weight of chassis is no greater than that of buses with a mechanical transmission.

See Our Exhibit—Space No. 253-A—255-A
A.E.R.A. Convention

LIBERTY

Liberty Motor Vehicle Co.,

2269 East 65th St.,
CLEVELAND, OHIO

DEDICATED TO THE OWNER

YOU want bus lighting fixtures that combine attractive appearance with superior light distribution. You can have these if your buses are equipped with

Adlake Lighting Fixtures

The cost of lamp maintenance will also be reduced because glass breakage is reduced. The fixtures are made in various sizes and styles to meet the needs of different types of buses and changing service requirements. No matter what your problem there is an ADLAKE fixture to solve it.

Let us tell you more about them, or see them at Space 405 (West Wing) at A.E.R.A.—Cleveland

THE ADAMS and WESTLAKE COMPANY
Chicago New York

MASSACHUSETTS MOHAIR PLUSH CO.

Bay State Brand CAR PLUSH

PLAIN, *and* FRIEZE Patterns

for car and bus seats

The durability of Mohair plush, as proven by its use in railroad coaches for over fifty years, and as shown in its use for automobiles for fifteen years, proclaims it the one material for upholstering that will supply the luxurious appearance, riding comfort, cleanliness, and long wear that you are seeking for your busses and cars. Our Mohair plush, grades such as are used in railroad cars, with ordinary care will outwear the bus, and will appear almost as good as new when the bus is discarded.

New York Agent
SISSON SUPPLY CO.
1845 Grand Central Terminal
New York City

Main Office
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Boston, Mass.

Western Agent
MIDGLEY & BORROWDALE
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Chicago, Illinois

Shop and Power Plant Equipment

ADVERTISERS IN THIS SECTION

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Babcock & Wilcox Co.
Bowser & Co., S. F.

Cameron Electrical Mfg. Co.

De Laval Separator Co.
Dolph & Co.
Dossert & Co.
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U. S. Graphite Co.
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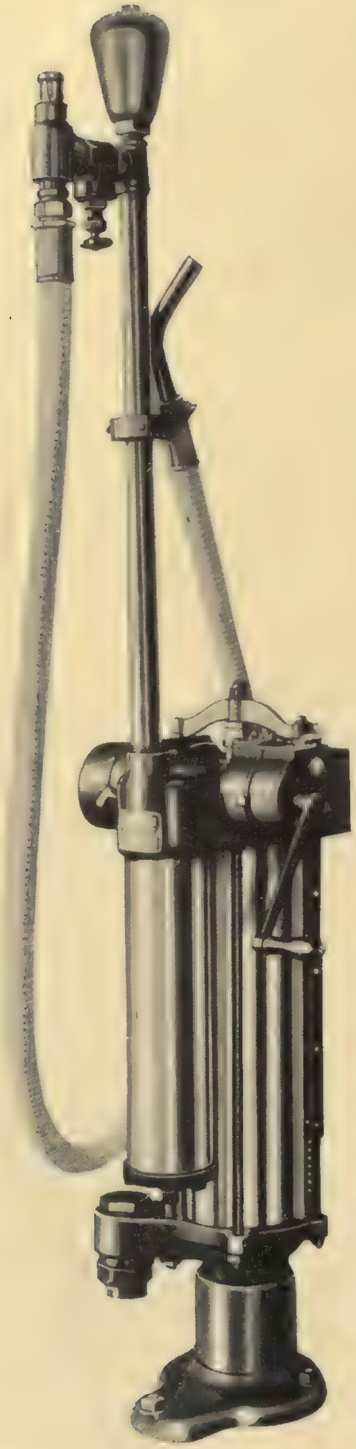
Valentine & Co.

BOWSER
ESTABLISHED 1885



FOR handling gasoline, a Bowser 101 pump is used in the garage of the Brooklyn-Manhattan Transit Corporation.

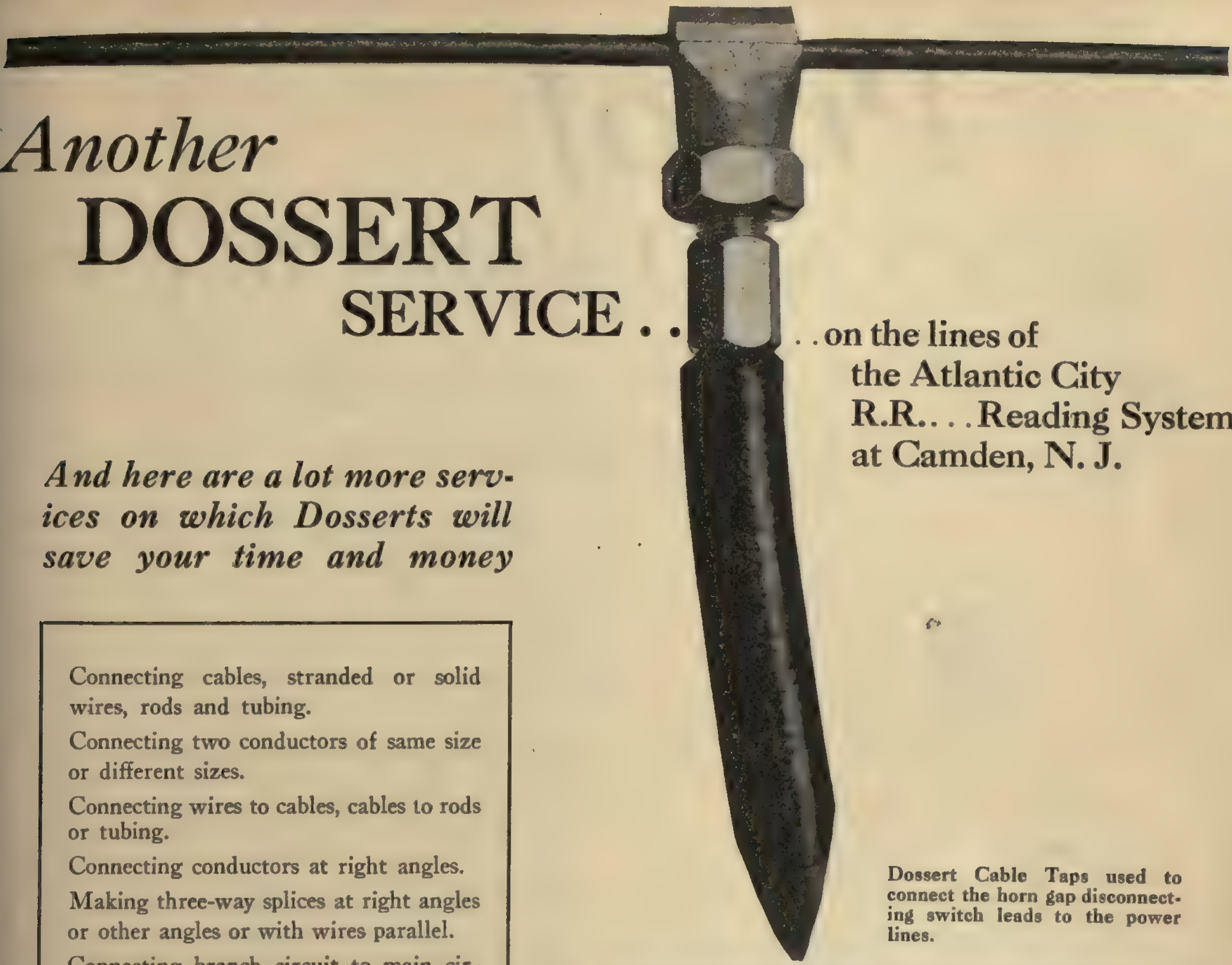
Why? Because Bowser 101 pump is very fast. It will fill the ordinary bus tank in less time than any other pump we know. Moreover, it is accurate as only a piston-type pump can be, and (being Bowser-built) there's practically no maintenance expense.

Bowser engineers have had long experience and can supply you with exactly the right equipment for your individual needs. Our standard equipment is engineered to fit your individual requirements—so we can not only save you money on equipment but can make an immediate installation.

For suggestions, please address Dept. 51.

S. F. BOWSER & COMPANY, Inc.
Pump and Tank Headquarters
FORT WAYNE, INDIANA.

Another DOSSERT SERVICE . .

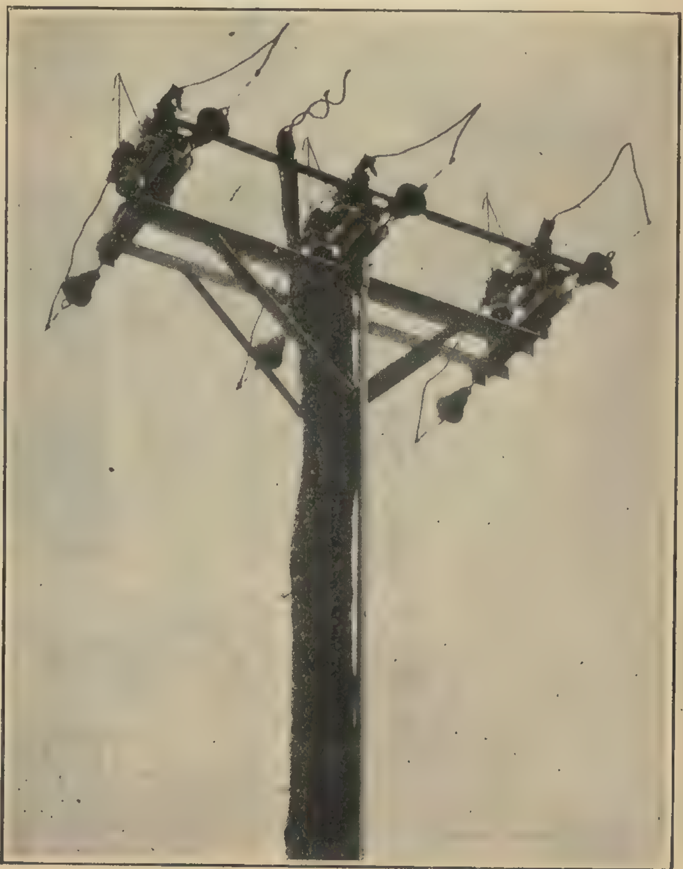


. . on the lines of
the Atlantic City
R.R. . . . Reading System
at Camden, N. J.

And here are a lot more services on which Dosserts will save your time and money

- Connecting cables, stranded or solid wires, rods and tubing.
- Connecting two conductors of same size or different sizes.
- Connecting wires to cables, cables to rods or tubing.
- Connecting conductors at right angles.
- Making three-way splices at right angles or other angles or with wires parallel.
- Connecting branch circuit to main circuit.
- Connecting one or two conductors to lug direct or at an angle.
- Connecting wires to studs.
- Connecting one or two cables to anchor.
- To equalize load on two feeders.
- Connecting to service boxes and cutouts.
- Connecting grounds.
- Connectors for all iron pipe sizes of tubings.
- Special connectors for special services.

Dossert Cable Taps used to connect the horn gap disconnecting switch leads to the power lines.



Write for the Dossert 20th Year Book which shows the line and the data.

DOSSERT & COMPANY

H. B. Logan, Pres.
242 West 41st St. New York, N. Y.

Proof

of TEXACO ability to serve

is written in the operating Records of such famous Roads as:

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

The TEXACO Booth
at the
AERA CONVENTION

will hold a hearty welcome for every visitor. If you want to talk Lubrication, Texaco Engineers will be only too glad of the opportunity.

New York Railways Company
New York City
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New York City
Brooklyn City Railroad Company
Brooklyn, N. Y.
Third Avenue Railway System
New York City
Boston Elevated Railway Company
Boston, Mass.
United Railway & Electric Company
Baltimore, Md.
Washington Railway & Electric Company
Washington, D. C.

TEX

TEXACO

The Chosen Lubrican

THE TEXAS COMPANY, U.S

OFFICE

—and the same service is available to every Progressive Electric Railway

A fully qualified TEXACO Engineer will gladly make a survey of your equipment. His recommendations will provide for lubrication of the entire system with oils and greases of known quality, and with a full guarantee of satisfactory service.

This is the practice followed by many of the largest and most successful operators in the country today.

ACO

f Electric Railways

Battery Place, New York City
INCIPAL CITIES

TEXACO

Mexican Graphite Curve Grease

Made to withstand the effects of rain, heat and cold, Mexican Graphite Curve Grease will adhere to the guard rail so that cars won't scrape it off nor will it be washed off by the first rain. Saves wear and tear on car wheels and rails.

Write for booklet "Quiet on the curves"

USG Brushes

Based upon a careful study of all the requirements, our Brush Engineers recommend brushes that will give longer and more satisfactory service.

Catalog B-4 gives details of USG Brushes

USG

MEXICAN

The United States Graphite Co.

Saginaw, Michigan

New York
Chicago
Philadelphia
St. Louis
Pittsburgh
San Francisco

LABOR *vs* INSULATION

Out of every dollar

Spent for insulation labor costs you 40 cents

—material only 10 cents!

Labor costs are constant. They do not vary, whether you use the best material money can buy, or the cheapest in the market.

What, then, is gained by using inferior insulation? You save a few cents per roll on varnished cambric tape, but you lose many times the amount in labor, if the work falls down. Furthermore, you run the risk of a dissatisfied customer, and the possibility of a lost account.

Sewed seams in bias cut, varnished cambric tape, necessitate the cutting out of the stitching. This results in loss of time and labor, to say nothing of the waste in material. Where taping machines are used, the lost time in stopping the machines for this purpose, increases your operating costs. It was to avoid this many-sided waste that we developed our "DUTCHESS-SEAMLESS" Bias Tape.

We have put the best raw materials available into our product, in order that we may offer you a 100% article. We are ready to demonstrate by sample, that this tape is the SUPERIOR INSULATION, inasmuch as it exceeds in points of

TENSILE, TEAR and DI-ELECTRIC STRENGTH, anything now offered in the Varnished Cambric market. Compare a piece of our ¾-in. "DUTCHESS-SEAMLESS" with any 1-in. you can secure, and be convinced that we know whereof we speak.

DUTCHESS INSULATION CO., INC., 168 Emmett Street, Newark, N. J.

DUTCHESS

SEAMLESS BIAS

Superior Varnished Cambric Insulating Tape

DUTCHESS INSULATION CO., 168 Emmett St., Newark, N. J.

Please send me a full 72-yd. roll of your "DUTCHESS-SEAMLESS" Bias Tape, that I may make my own tests. It is understood that this is to be sent gratis.

Yel. ◇ Blk. ◇ ¾-in. ◇ 1-in. ◇ .007-in. ◇ .010-in. ◇

Name ....

Address ....

Town ....

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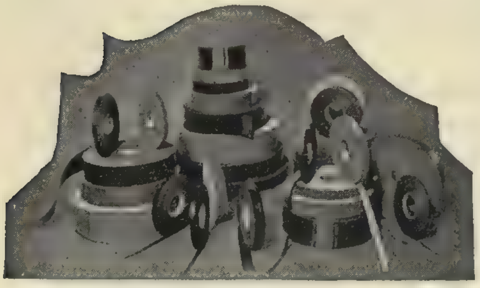
P

IRVINGTON INSULATION



As originators of Black Varnished Cambric, we recommend it for every use to which Yellow Varnished Cambric can be put because of superiority in heat resistance, dielectric strength, alkali and acid resistance and its better ageing qualities.

Exhibit No. 138
CLEVELAND

"Irvington Seamless Bias"

First designed and perfected by this company, it offers a bias constructed tape without seams that will save time and material and insure smooth, tight windings. One 72-yard roll saves 52-in. of material when compared with one 72-yard roll of sewed bias where seam cutouts are necessary.

Insulating Varnishes

IRVINGTON Insulating Varnishes developed by intensive research to meet particularly the needs of the electrical railways. A complete line including clear and black baking, air drying and finishing varnishes. Special varnishes developed to meet your requirements. Submit us your specifications.

otection!

Irvington Insulation

offers you

Experience and Background

Over twenty years devoted solely to the manufacture of Varnished Insulation which has successfully stood the test of time.

Complete Control of all Processes

The only plant independent of all except raw material markets. A complete unit devoted exclusively to finishing cloth suitably for varnished insulations.

A Thoroughly Fireproofed Plant

Designed in units to assure you a continuous source of supply.

Laboratory Control of Processes

Including chemical, electrical and physical inspection of all products, maintenance of test standards and sufficient research to insure improvement.

Capacity

Sufficient productive capacity to meet emergency demands and insure prompt delivery.

Result—*Balanced Insulation*

In which *every* necessary quality is present at a maximum value without detriment to *any other* fundamental requirement.

Send for catalogue 101-B

IRVINGTON VARNISH & INSULATOR Co.
Irvington, New Jersey.

Established 1905

Sales Representatives:

Mitchell-Rand Mfg. Co., New York	Prehler Bros., Chicago
T. C. White Electrical Supply Co., St. Louis	Consumers Rubber Co., Cleveland
E. M. Wolcott, Rochester	Clapp & Lamoree, Los Angeles
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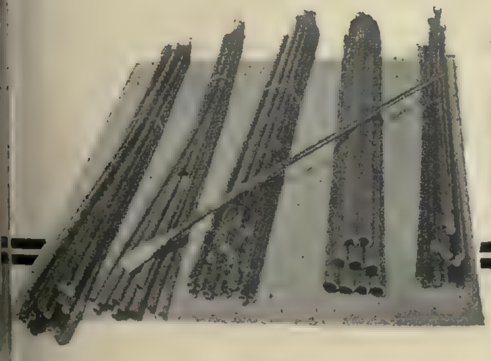
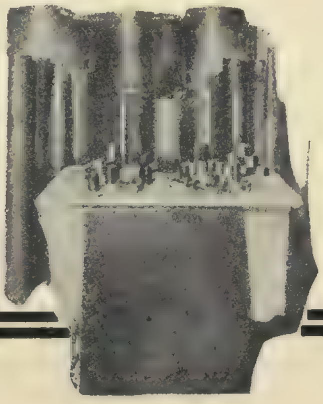


Motor Lead and Transformer Lead Flexible Varnished Tubing

A convenient insulation for internal connections. Made in all diameters from .050 in. to .75 in. Reinforced with turns of varnished cloth to meet particular voltage specifications.



Cellulak Tubes

Paper laminated with insulating compound to form a strong, rigid tube with excellent mechanical and insulating properties. Of particular use in cable splices where high voltage is encountered.

Better Finish—Longer Life!

NITRO-VALSPAR

PRIMER GUNGLAZE ENAMEL

NO WEAK LINK

The Complete Lacquer System

The Nitro-Valspar *all-lacquer* system has no weak link. The materials of the system form one homogeneous whole from metal to wearing surface, eliminating all possibility of cleavage points.

Since Nitro-Valspar Primer, Gunglaze and Enamel are all quick-drying, lacquer materials, the entire system may be applied in from 1 to 3 days. Labor hours are materially reduced and production costs are cut to the bone.

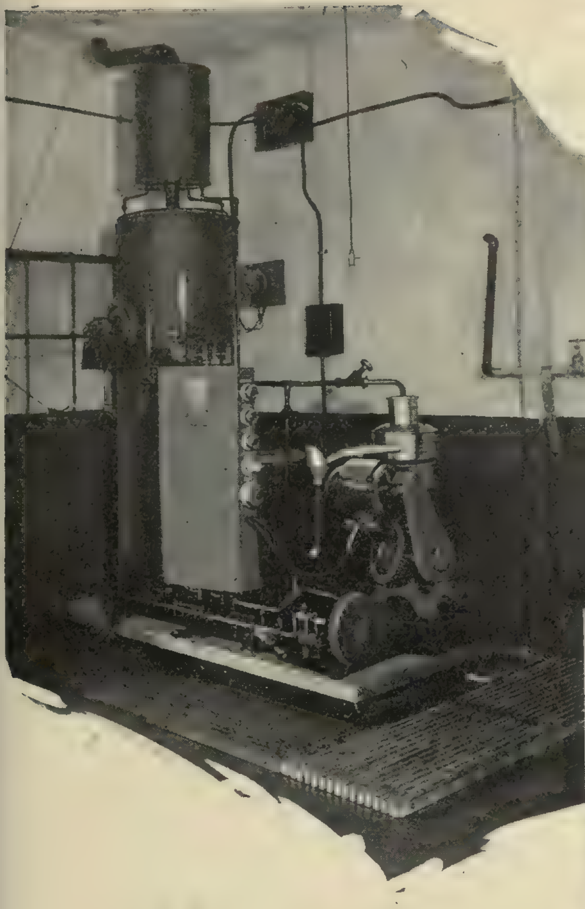
Valentine + Company

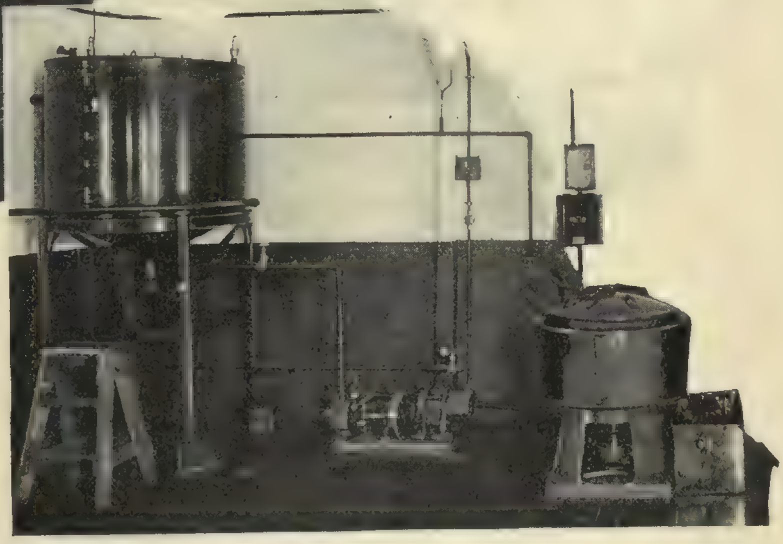
Convince Yourself!

We are exhibiting the all-lacquer Nitro-Valspar system for painting Transportation Equipment in space 267A of the Auditorium during the American Electric Railway Association Convention at Cleveland, October 4th—8th. Come and see the exhibit. You'll find a finish there worth investigation.

De Laval

crankcase oil reclaiming outfit - - - - - economically reclaims 80% - - - - - - of bus oil - -





These illustrations show the De Laval oil reclaiming and waste extracting plant recently installed for the Washington Railway and Electric Co.

The Washington Railway and Electric Company of Washington, D. C., uses the De Laval Crankcase Oil Reclaiming Outfit to reclaim oil drained from the crankcases of its buses and trucks. A De Laval Centrifugal Extractor and De Laval Oil Treating Tank are also installed to provide a means for reclaiming the oil and waste used to lubricate its electric cars. The entire installation is operated by one man who still has time available for other work.

Over 80% of all crankcase oil used is saved by this method and used again, at full efficiency. This percentage of recovery amounts to about 99% of the reclaimable oil, the remainder consisting of dilution, carbon and other impurities. Most of the gasoline removed from the oil is reclaimed in the Fume Condenser and is used about the shops for washing purposes.

Car axle oil is extracted from the waste in the De Laval Extractor and purified by the De Laval Oil Purifier which is a part of the Crankcase Oil Reclaiming Outfit. Both the oil and waste are saved and used again.

The De Laval Crankcase Oil Reclaiming Outfit renews old oil at a cost of 10 cents to 18 cents a gallon; restores its viscosity—its power to lubricate and resist heat; enables you to change oil more frequently. Car axle oil and waste are reclaimed at much lower cost.

Any garageman can operate the De Laval, and in a comparatively short time it will pay for itself.

Mail the coupon today for complete details.

The De Laval Separator Company

165 Broadway, New York **600 Jackson Blvd., Chicago**
DE LAVAL PACIFIC COMPANY
San Francisco

We are interested in obtaining more efficient lubrication at lower cost. Please send full information as checked:

☐ Crankcase Oil.
☐ Car Axle Oil.
☐ Combination.

Company ....

Individual ....

ERJ-650A

Address ....

The largest organization in the world
devoted to the manufacture of mica insulation

Always at the service of the electrical industry are the unexcelled manufacturing, engineering and research facilities of this organization.

Know that these facilities and the 33 years of experience on which they are founded are yours to requisition—whether your need may be for expert advice on some insulating problem, for assistance in insulation research work, or for insulating materials.

MICA INSULATOR COMPANY
Established 1893
World's Largest Manufacturers of Mica Insulation
New York: 68 Church Street Chicago: 542 So. Dearborn Street
Works: Schenectady, N. Y., Victoriaville, Canada; London, England
Representatives in Principal Cities

PERFECT MICANITE INSULATOR REG. U.S. PAT. OFF. Electrical INSULATION PERFECT EMPIRE INSULATOR REG. U.S. PAT. OFF.

MICA INSULATION OILED CLOTH INSULATION

Lascar

The Arab legend still survives that Socotran women used to sit on the rocks and lure the lascar—or mariners—to disaster with their winsomeness.

Since earliest times the drawing power of attractive equipment is on record.

The big trouble with all the legends about such lure is that the poor lascar found that when he yielded to the temptation of attractiveness—that's all there was—there wasn't any more.

So in this big plea for modernization and more attractive railway equipment, let us raise this Munyon-finger of warning. . . to-wit:

Once you've attracted passengers with winsome equipment, don't let it end with just that —deliver the goods with good motor service.

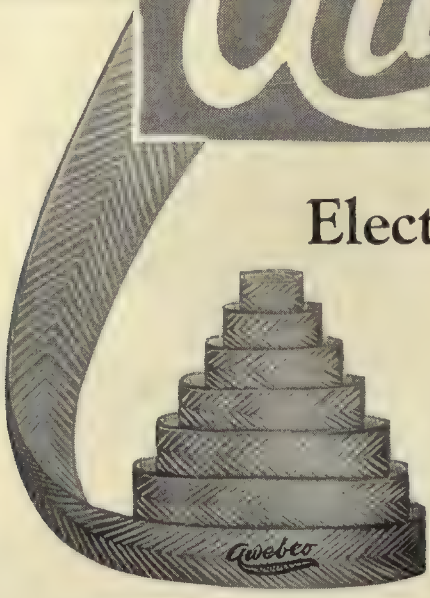
EQUIP THE MOTORS
WITH MORGANITES

---to the las' car

Morganite
Brush Co., Inc.

Main Office and Factory: 519 West 38th Street, New York

Awebco
TRADE MARK



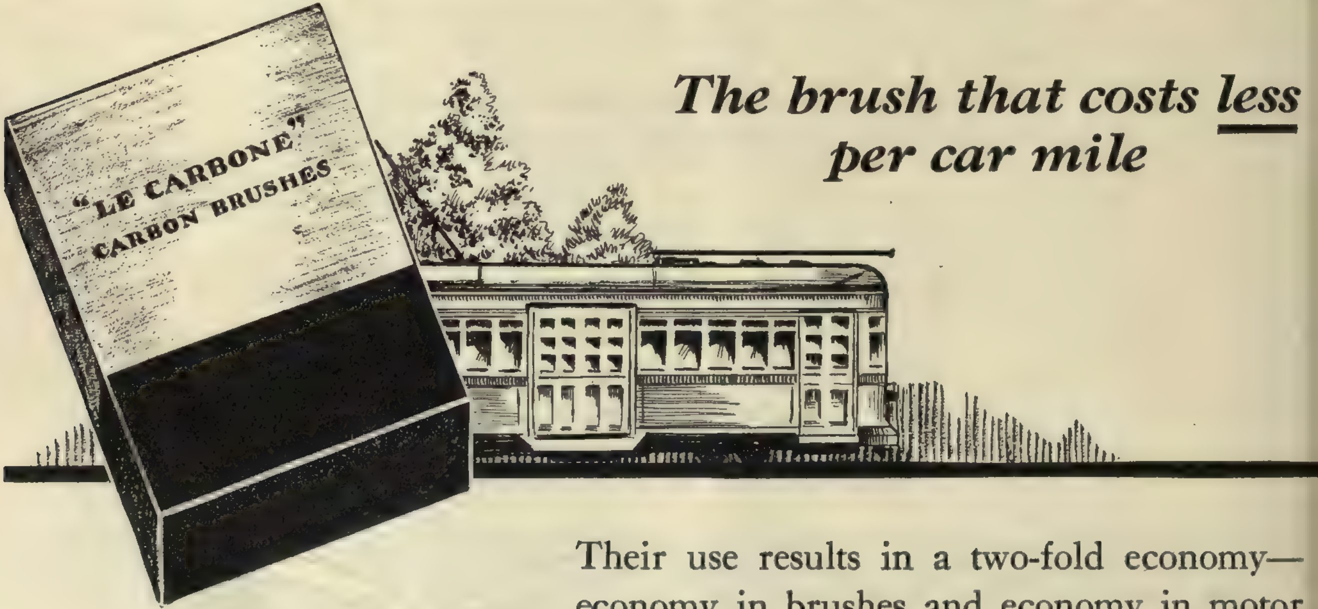
Electrical Tapes and Webbings

In the construction or repair of dynamos, motors, or transformers, Awebco Tape is used extensively to wind the field coils and armature conductors. Its lasting quality insures continued satisfaction.

Write for samples and complete information.

Anchor Webbing Company
300 Brook Street, Pawtucket, Rhode Island
New York, Chicago, Cleveland, Pittsburgh, St. Louis, etc., etc.

The brush that costs less per car mile

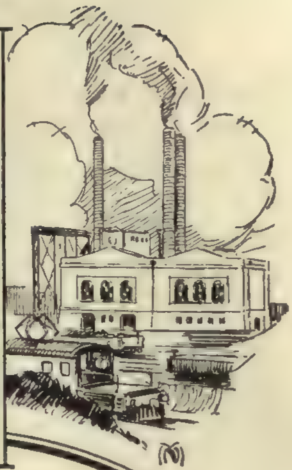


Their use results in a two-fold economy—economy in brushes and economy in motor upkeep.

Over 25 years of service proof.

W. J. JEANDRON

Hoboken Factory Terminal, Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg. Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal and Toronto



The Refiner's Task

NO business requires closer contact and co-operation with industrial progress than that of the refiner of lubricants. Every day, new machinery is being designed. Every day, new mechanical refinements are developed. In many cases, the success of these new inventions and refinements depends upon the possibility of efficient lubrication.

This means that the refiner must be ever on the alert to meet and solve the lubricating problems brought up by each new piece of machinery. His laboratories must be constantly busy with researches and experiments. His engineers must know what is being done by the inventors and designers of machinery, so that the lubrication requirements of each new machine may be met before the machine is placed on the market.

Standard Oils and Greases

are made in many grades, to meet the lubrication requirements of all machinery in use in the industrial world today. The Standard line of lubricants is kept constantly up to date by the researches and experiments carried on by the engineers of the Standard Oil Company (Indiana).

Standard Oils and Greases, when used in the grades that exactly suit the requirements of the machinery in your plant, will reduce your repair and depreciation costs. Our representative will recommend the correct grades.

STANDARD OIL COMPANY
(INDIANA)
910 South Michigan Avenue Chicago, Illinois

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
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THE BABCOCK & WILCOX COMPANY STEAM

WORKS
Bayonne, N. J.
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Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

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DENVER, 444 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
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LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

"American"

Light and Heavy SPRINGS

Advantageous location for prompt delivery of raw materials—Ample equipment of modern automatic machinery and appliances — Pyrometer equipped furnaces assuring accurate, uniform heat treatment and over 35 years' spring manufacturing experience constitute a service which means satisfaction.

May we estimate on your needs?

AMERICAN SPIRAL SPRING & MFG. CO.
Established 1887
ARSENAL STATION
PITTSBURGH, PA.,
U. S. A.

TULC A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.

INDUSTRIAL GASES

OXYGEN
ACETYLENE

I.O.C. SYSTEM

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NITROGEN

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

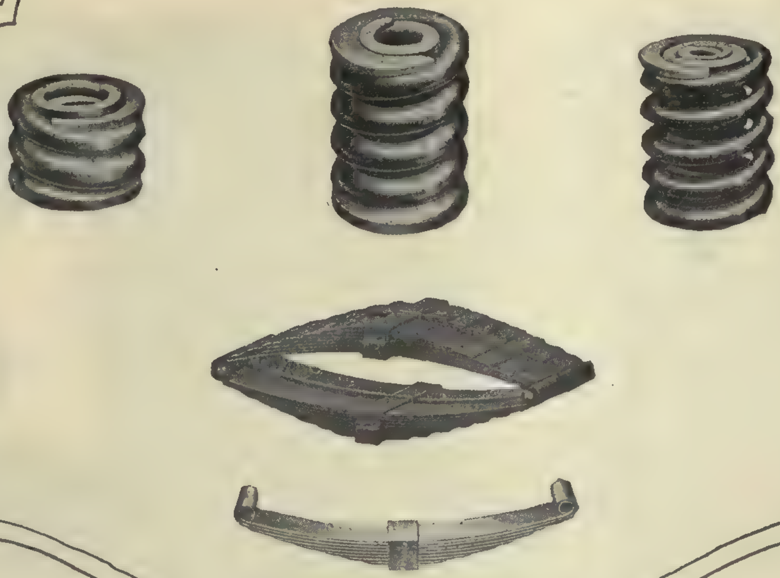
Cameron Electrical Mfg. Co., Ansonia, Connecticut

A load off your mind

When you place the responsibility for the inspection and testing of the cars you purchase with this organization you not only relieve yourself of the worry and expense incidental to this work—but you are absolutely assured that the cars are built to exact specification, and are in perfect running order, and will give the service you have a right to expect.

Bulletin No. 28 tells how you can use P.T.L. Service to real advantage.

PITTSBURGH TESTING LABORATORY
Inspecting Engineers and Chemists
PITTSBURGH Penna.
Branch Offices in the Principal Cities



The Spring "buying habit"
of the modern railway organization

Leading railway operators for over 20 years have been buying "Fort Pitt" Springs regularly. Today, as never before, proper spring equipment is a requisite for the electric railway car. Comfort in riding qualities and endurance are the modern demand. The superior service obtained from Fort Pitt springs is responsible for their sustained popularity. Spring "buying habit" is the Fort Pitt habit, all the year 'round.

Ask us for quotations on prompt shipments of the types you use, whether standard or special.

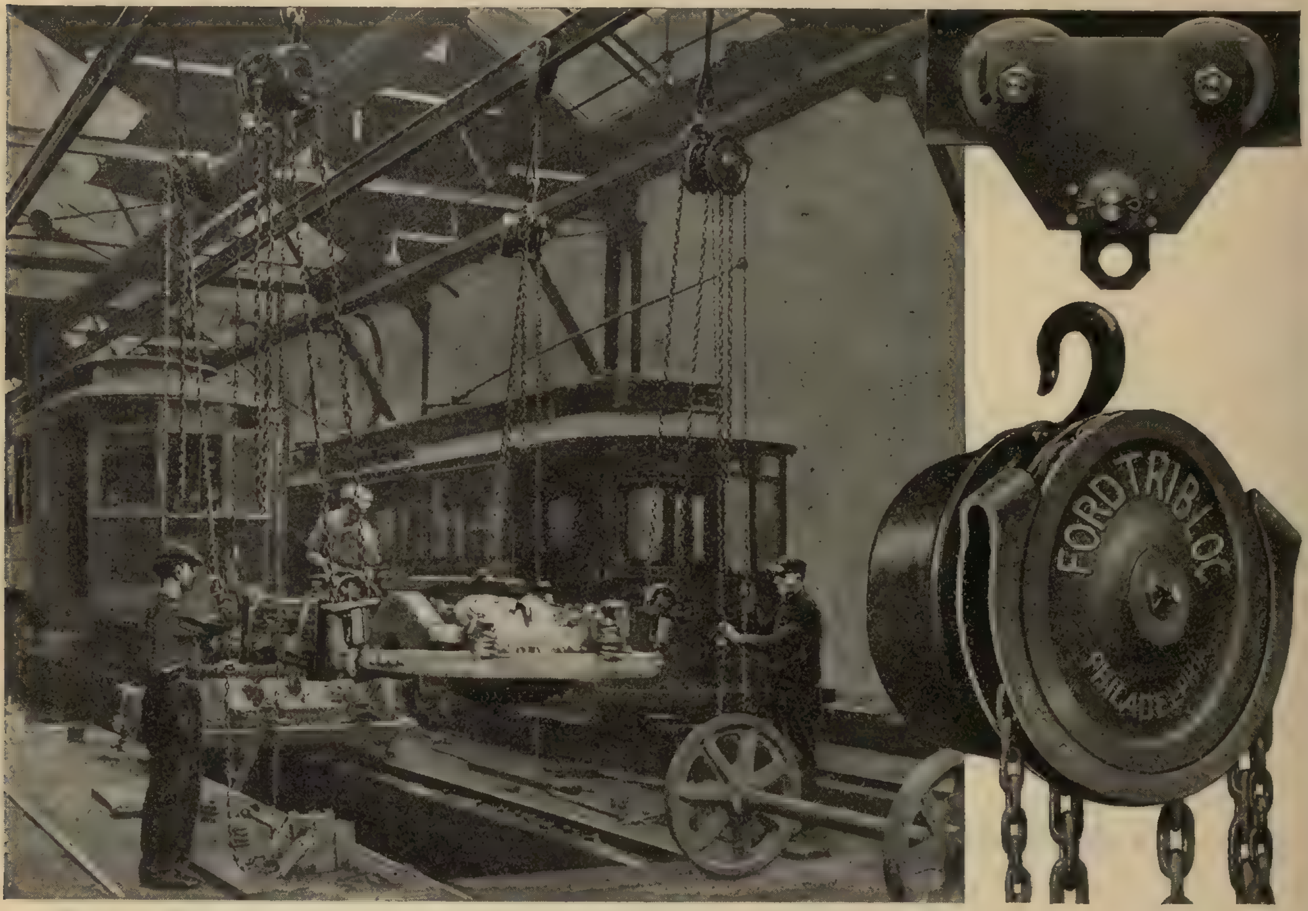
Full Elliptics for Car Trucks; Half Elliptics for locomotives and cars; Special Types of quarter, half and three-quarter elliptics for electric railway service. Drawbar springs, equalizer springs, extension springs.

Is our catalog in your files?

Fort Pitt Spring & Manufacturing Co.
Pittsburgh, Pa.

FORT PITT

FORD CHAIN HOISTS and TROLLEYS



Raise fare values by lowering shop costs!

Because lower costs invariably increase the relative value of passenger fares, it naturally follows that equipment which helps lower shop costs has potential capacity to increase net profits.

Tribloc Chain Hoist Equipment is qualified by years of consistent results to do this very thing. Sturdy, safe and smooth-operating, it aids your men in the quick and satisfactory performance of their work. It is made in types to meet every requirement of the car shop and bus garage. It is economical in both first cost and maintenance—its life is measured by years of profitable operation.

Lowering the cost of passenger transportation on the road is vital. Less costly *load transportation in the shop* is also highly important. Let us show you how Tribloc Chain Hoists and Ford Roller Bearing Trolleys are saving money and valuable time for others under operating conditions similar to yours.

Send for Catalog 7-B

FORD CHAIN BLOCK COMPANY
2nd and Diamond Sts. Philadelphia, Pa.

We also Manufacture "THE MOTORBLOC"—*an electrically driven chain hoist.*

Car and Truck Equipment

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American Spiral Spring & Mfg. Co.
Ass'n of Mfrs. of Chilled Car Wheels

Bemis Car Truck Co.
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* Includes Searchlight Section

SPACE 238

AMERICAN ELECTRIC RAILWAY ASSOCIATION

Convention

At Space 238, the makers of Gary Wrought Steel Wheels will hold open house during the Convention. In addition to viewing our exhibit (be sure, incidentally, to ask us about the new Gary Wheel, especially adapted to freight car service) you are invited to make this booth your convention headquarters. Tell your friends you'll meet them at Space 238.

Cleveland, October 4-8

Cleveland
October 4-8

GARY
WROUGHT STEEL WHEELS

Illinois Steel Company

100 · YEARS · OF · MANUFACTURING · EXPERIENCE ·

No. 11-F

The Latest H-W Contribution To Distance Travel Comfort

The lately designed "Traveluxe" type seat for long distance and interurban travel has new and desirable features for both you and your passengers.

THE SPACE occupied by this seat permits more seating capacity for any over-all length than any other on the market, with no sacrifice of roominess.

THE COMFORT of this seat has never been surpassed. The back is carefully shaped, with springs thicker at the point of the back where most riding strain occurs, and pitched for solid comfort. The seat is wide, roomy and deep, with removable comfy cushions over H-W standard spring construction.

This is the type of seat now sought and used by the most successful passenger transportation companies.

See this and our complete line of Electric Car, Bus and Motor Coach Seats at the A.E.R.A Convention —Cleveland, October 4 to 8, Booths 294, 295 and 296.

Heywood-Wakefield

REG. U.S. PAT. OFF.

HEYWOOD-WAKEFIELD SALES OFFICES

Heywood-Wakefield Company, Wakefield, Mass.

Heywood-Wakefield Company,
516 West 34th St., New York, N. Y.

Herbert G. Cook,
Hobart Bldg., San Francisco, Cal.

The G. F. Cotter Supply Co.,
Houston, Texas

Heywood-Wakefield Company,
439 Railway Exchange Bldg., Chicago, Ill.

Frank N. Grigg,
630 Louisiana Ave., Washington, D. C.

Railway & Power Engineering Corporation,
133 Eastern Ave., Toronto;
Montreal; Winnipeg, Canada

HASKELITE *and* PLYMETL

Haskelite and Plymetl Sell the Street Car Operator and Builder because they have all the elements that make a sale

Strength

HASKELITE roofs withstand severe blows without damage. PLYMETL side panels resist puncture and indentation in traffic accidents. Many times stiffer than sheet steel.

Appearance

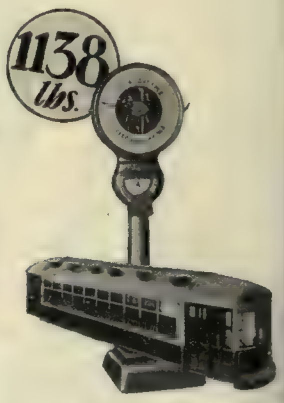
The beautiful exterior finish made possible by PLYMETL side panels and HASKELITE roofs and the interior effects which can be secured only with natural finish HASKELITE trim attract passengers and increase revenue.

Light weight

An ordinary car fully utilizing HASKELITE and PLYMETL weighs 935 lbs. less than a car using substitute materials.

Economy

HASKELITE and PLYMETL are easy to handle and easy to screw or rivet in place. Therefore, the first cost of the HASKELITE-PLYMETL car is low. The operating cost is a minimum on account of the light weight.



Weigh Car Bodies on Any Scale

HASKELITE *and* PLYMETL

Haskelite and Plymetl regularly sell the leading Car Builders and Operators.

Typical car builders using HASKELITE and PLYMETL are:

CINCINNATI CAR CO.
Cincinnati, Ohio

THE J. G. BRILL COMPANY
Philadelphia, Pennsylvania

OTTAWA CAR AND MFG. CO.
Ottawa, Canada

ST. LOUIS CAR COMPANY
St. Louis, Missouri

G. C. KUHLMAN CAR COMPANY
Cleveland, Ohio

WASON MANUFACTURING CO.
Springfield, Massachusetts

CUMMINGS CAR AND COACH CO.
Chicago, Illinois

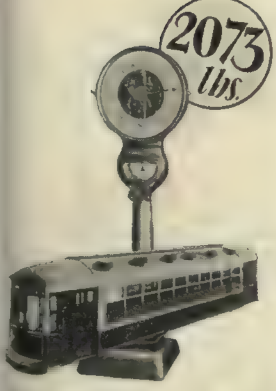
PRESSED STEEL CAR COMPANY
Pittsburgh, Pennsylvania

LIGHT WEIGHT NOISELESS CAR CO.
Chicago, Illinois

AMERICAN CAR COMPANY
St. Louis, Missouri

OSGOOD-BRADLEY COMPANY
Worcester, Massachusetts

NATIONAL STEEL CAR CORP., LTD.
Hamilton, Ontario, Canada



The HASKELITE-PLYMETL body surpasses ordinary construction in light weight, attractiveness, strength, economy, endorsement by the industry, etc. See the HASKELITE scales in Booth 362 at Cleveland.

Among the leading operators who are using HASKELITE and PLYMETL regularly are the following:

BOSTON AND MAINE R.R.
Boston, Mass.

THE CHICAGO, NORTH SHORE & MIL. R.R., Highwood, Illinois

CHICAGO SURFACE LINES
Chicago, Illinois

THE CINCINNATI TRACTION CO.
Cincinnati, Ohio

COLUMBUS RY., POWER & LIGHT CO.
Columbus, Ohio

THE DENVER TRAMWAY COMPANY
Denver, Colorado

DETROIT UNITED RAILWAY
Detroit, Michigan

FORT SMITH LIGHT & TRACTION CO.
Fort Smith, Arkansas

GALVESTON-HOUSTON ELEC. CO.
Galveston, Texas

GRAND RAPIDS RY. CO.
Grand Rapids, Michigan

GEORGIA RY. & POWER CO.
Atlanta, Georgia

ILLINOIS TRACTION, INC.
Chicago, Ill.

INDIANA SERVICE CORP.
Fort Wayne, Indiana

LOS ANGELES RAILWAY CORP.
Los Angeles, California

MILWAUKEE ELEC. RY. & LIGHT CO.
Milwaukee, Wisconsin

MONONGAHELA-WEST PENN PUBLIC SERVICE CO., Fairmont, West Virginia

MONTREAL TRAMWAYS CO.
Montreal, Quebec, Canada

MUNICIPAL RAILWAY OF SAN FRANCISCO, San Francisco, Cal.

PACIFIC NORTHWEST TRACTION CO.
Seattle, Wash.

THE PENNSYLVANIA-OHIO ELEC. CO.
Youngstown, Ohio

PHILADELPHIA RAPID TRANSIT CO.
Philadelphia, Pa.

THE PINE BLUFF COMPANY
Pine Bluff, Arkansas

PITTSBURGH RAILWAYS CO.
Pittsburgh, Pennsylvania

PUBLIC SERVICE RAILWAY CO.
Newark, New Jersey

SAN FRANCISCO-SACRAMENTO R.R.
Oakland, California

TORONTO TRANSPORTATION COMMISSION, Toronto, Ontario, Canada

UNION TRACTION COMPANY
Albany, New York

UNITED TRACTION COMPANY
Albany, New York

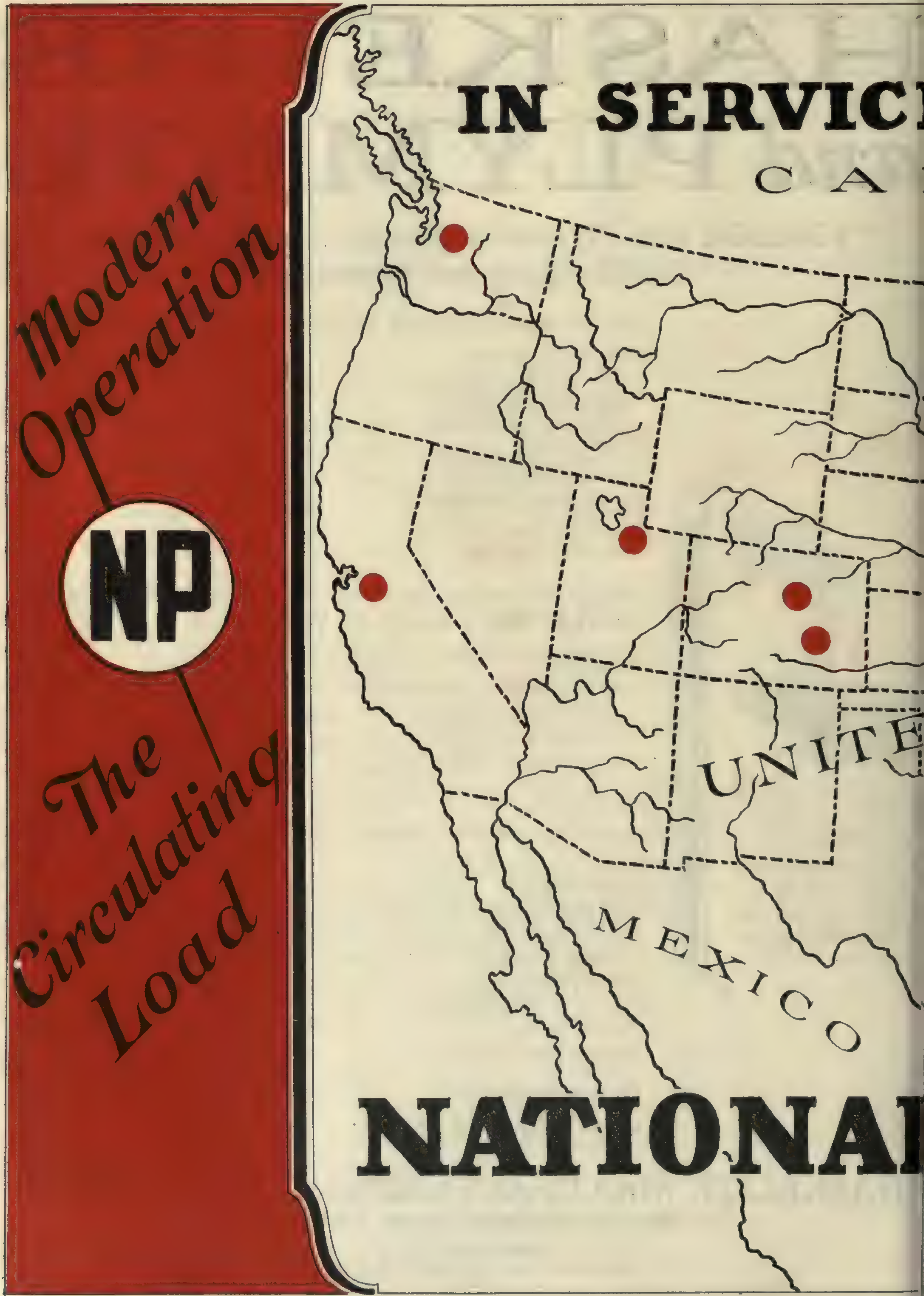
YORK RAILWAYS CO.
York, Pennsylvania

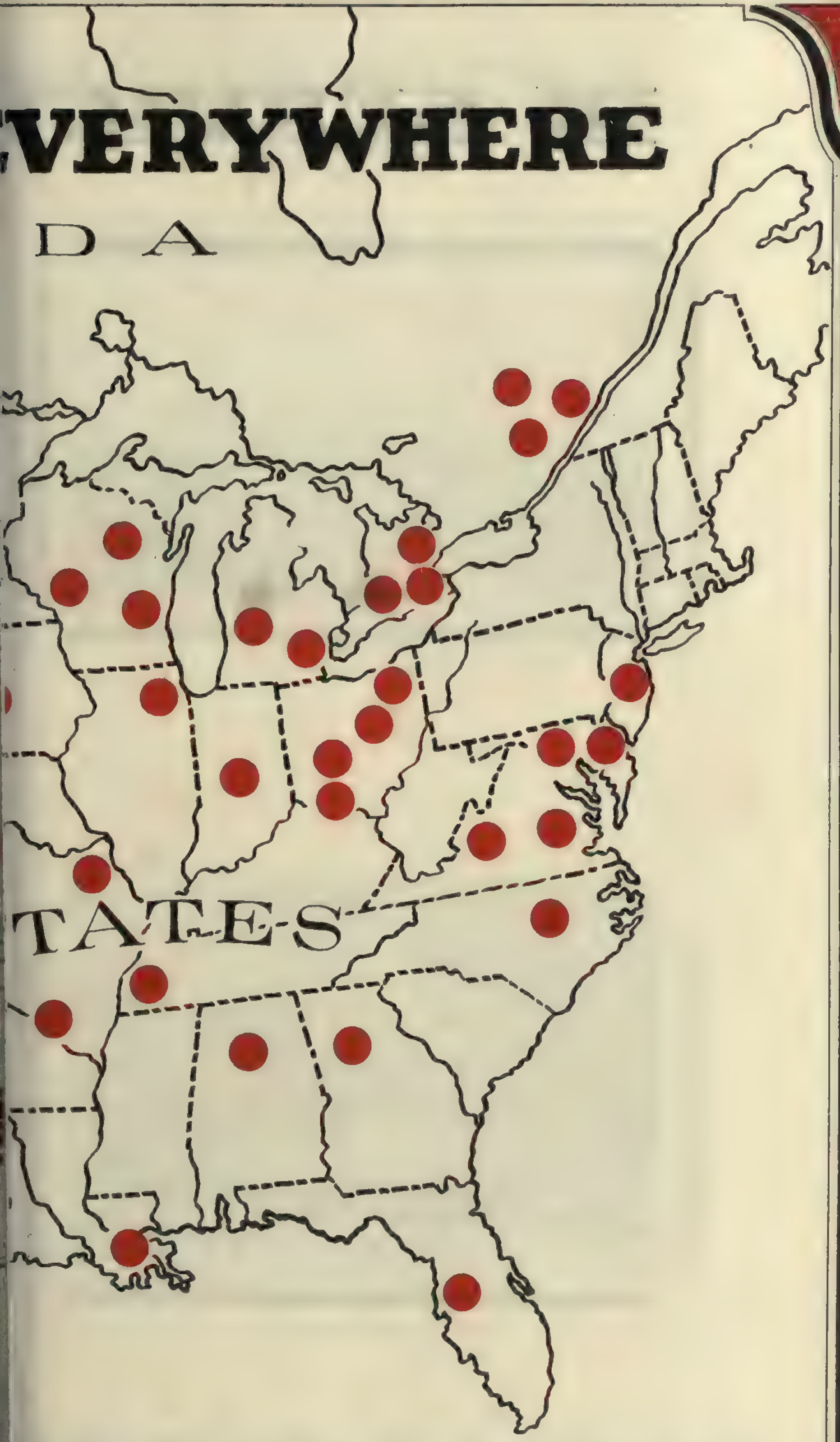
HASKELITE MANUFACTURING CORPORATION

133 West Washington Street, CHICAGO

Canadian Representatives:
Railway and Power Engineering Corporation, Ltd.
Montreal Toronto Winnipeg

ERJ 9-25 Gray


Modern Operation
NP
The Circulating Load
IN SERVIC
CA
UNITE
MEXICO
NATIONA



NEUMATIC

The Circulating Load

NP

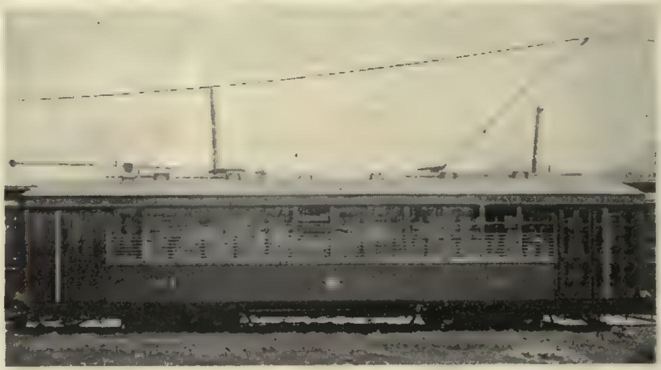
Automatic Treadle Door

Four Widely Separated Users

NP

Montreal
Salt Lake City
Milwaukee
Atlanta

IN SERVIC



Milwaukee Electric Ry. & Light Co.

Utah Light & Power Co.

NATIONA

RAHWA

NEW YORK P

VERYWHERE

Montreal Tramways Company

Georgia Railway & Power Co.

NEUMATIC

W JERSEY

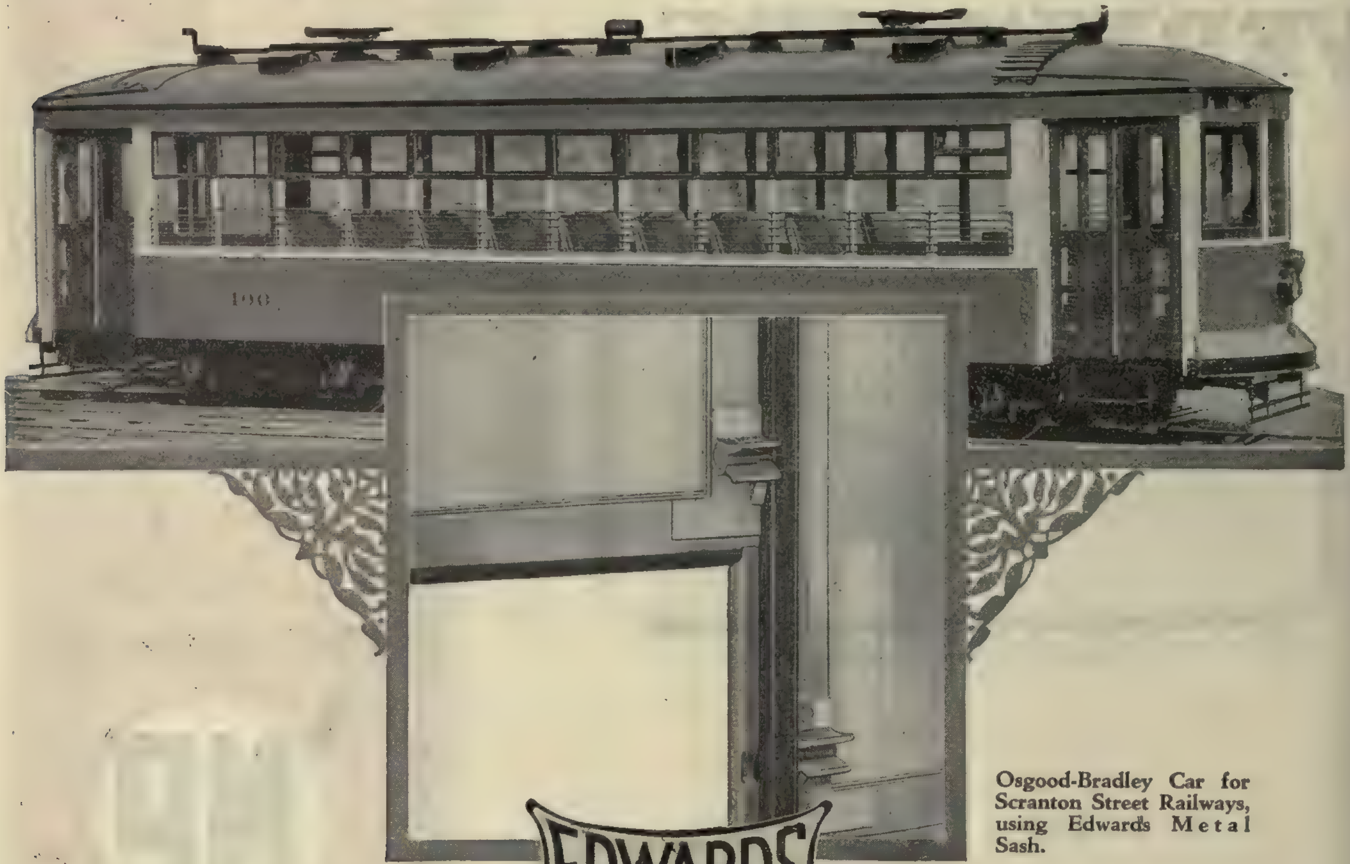
PHIA CHICAGO

a demonstration of the Circulating Load Method at booth 107-109-111

NP

by the use of the Automatic Treadle Door

WINDOWS DO MAKE A DIFFERENCE



Osgood-Bradley Car for Scranton Street Railways, using Edwards Metal Sash.

EDWARDS
TRADE
PAOWNYC
MARK

Modernize Today for Patronage Tomorrow

Attention to car passenger comfort today means increased patronage for many years to come. Neglect the passenger and he will seek other means of transportation.

The demand for better transportation is here—a demand which will be met only with greater passenger comfort through modernized equipment.

Edwards Metal Sash is more than a light weight, easily operated frame to hold glass.

It provides increased passenger comfort by eliminating deafening, nerve-racking window rattles.

It provides increased passenger comfort through wider vision, through windows that open and close easily, through air-tight protection against wind, rain and cold.

To the railway operator, Edwards Metal Sash means economy, ease of maintenance, effortless window cleaning, and long life under the most difficult operating conditions.

Edwards Metal Sash is part of your modernization program. Specify it on your next car order. And send for catalog today—to prepare for patronage tomorrow.

O. M. Edwards Co., Syracuse, N. Y.

Canadian Representatives: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

EDWARDS Metal Sash

CINCINNATI *New* CARS

—a step ahead of the modern trend—

Every line a distinctive line
Every feature a paying feature
—and every car built a
demonstrated
success

BALANCED

"Curved Side Construction" Wide Seats and Aisle with Ample Vehicular Clearance

Cast Aluminum Side Frames —light weight, and non-rattling windows

Superstructure tied to bolster with high carbon steel bows

continuous from side sill to side sill.

Scientifically Correct Lighting and Ventilation

A Dominant Principle of ca

Everyone who has seen Cincinnati New Cars knows that there *is* a difference.

It is not a difference that comes of extremes in any one feature. And yet it is instantly apparent whether the car be at rest or in motion, empty or full of passengers;—it is *car character born of a unique balance between every unit and every detail of construction.*

This dominant principle of Balanced Design is not new. It has been gradually established and perfected in its application by Cincinnati engineers through 10 years of successful car building. But its ultimate use as the one logical basis on which to build Cincinnati New Cars has been made possible only through a bold break with prec-

Cincinnati Built
means Cincinnati designed, too!

DESIGN

uilding exclusive to Cincinnati

edent, and the placing of design as well as construction under one control.

Thus Cincinnati built means Cincinnati designed, too. It means that all Cincinnati New Cars will have the unique features (briefly noted in the panels on these pages) which have proved signally successful on installations made to date. It means that every smallest part will take its proper place as a co-ordinated unit in a completely balanced whole.

And it means too that new car buying for any class of service becomes infinitely *simpler* with elimination of laborious detail in specification and with a certainty of satisfactory results from equipment accurately balanced in its adaptability to specific service conditions.

Actual operating data, containing facts and figures on the earning power and consistent economy of Cincinnati New Cars under widely differing service conditions, is available to all interested executives on request.

CINCINNATI
New
CARS

Duplex
Air
and Magnetic
Brakes
—"from 60 mph to *stop* in 14 seconds.

Special
intermediate
full length
door hinges
prevent sag

Furniture Finish
Armco
Rust Resisting
Side Panels

Case-Hardened
Alloy Steel
wearing parts
on trucks

1-2-3

A Unique Convention Exhibit

Two cars and a locomotive!

But two cars so entirely different from anything you've seen before that they give some meaning to the word NEW.

Duplex Air and Magnetic Brakes,—as applied to a modern high-speed car—and a hundred other ingenious NEW ideas which have already proved that modern cars pay and pay well!

The locomotive will interest you too, because it is essentially a locomotive for *interurban* freight work. A "husky" with a 40,000 lb. draw-bar pull, capable of negotiating a 35-ft. radius, *and planned to incorporate old motors and control you might otherwise have to scrap,*—"a modern locomotive from obsolete cars."

Plan above all else to see this *unique* exhibit. Full descriptions in the Convention Dailies of this paper. Watch for them!

Exhibits on Track Two

THE CINCINNATI CAR COMPANY
Cincinnati, Ohio

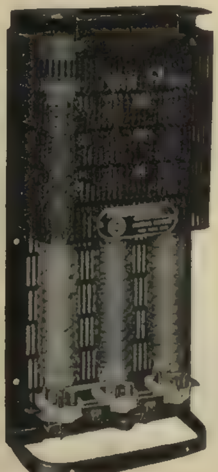
CINCINNATI
New
CARS

A step ahead of the modern trend

Winter and Car Heating Time Are Approaching

No. 414 E Panel

No. 478 E Truss Plank



No. 470 E Vestibule

BOOTH **GOLD** No. 297

Enclosed Elements Supplied If Desired.

Keep up with the times! Heat your modern cars in a modern way. Now is the time to seriously consider this year's car heating. Make a survey of your heaters *now* to ascertain their condition as well as what their operation and maintenance costs were last winter.

Then drop in at Booth No. 297 at the Convention and see what economies can be effected by the installation of

GOLD'S ELECTRIC CAR HEATERS

Compare your figures with the actual records of Gold's Electric Heaters and be convinced of the economies that can be effected in heater operation and maintenance costs. As an example, one company has in service 12,000 Gold Electric Heaters. Over a period of more than 11 years they spent only $200 for repair parts—all repair parts being bought direct from us.

If you are replacing some obsolete equipment with modern cars it is to your advantage to include Gold's Electric Heaters in your specifications with a request to the Car Builder to ask for proposal.

Gold Car Heating & Lighting Co.
Bush Terminal
220 36th Street, Brooklyn, N. Y.

Interurban Cars

Chicago & Joliet Electric Ry

CREATE new business! With new attractive, modern cars. That's the formula of the Chicago & Joliet Electric Ry., who have replaced old style, heavy equipment with these new, light weight, *one-man,* single end cars, built by Cummings Car and Coach Co. Pictures cannot convey the real beauty of these cars, with their mahogany interior finish, de luxe seats and deep, luxurious cushions, wide aisles,

Cummings Car

Successor to McGuire-Cummings Manufacturing

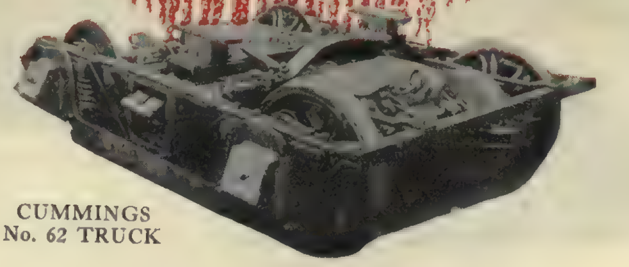
hat Draw Riders purchases Cummings Cars to Build Business

linoleum floor coverings, and Pullman lighting fixtures. Notice the handsome exterior, with wide letter board, adding strength as well as giving a fine stream line effect to the body and the special color scheme, all of which impress one at once with a desire to ride upon the car.

The seats in the smoking compartmen are of genuine leather and a cabinet below the rear vestibule window encloses control equipment for backing the car. The controller, air piping and miscellaneous equipment, located at the front of the car, are all enclosed in a cabinet.

Equipped with four 35 h.p. motors, on Cummings No. 62 trucks, these cars have quick get away, and exceptional easy riding qualities. The cars weigh approximately 38,000 pounds each, as compared to the weight of 60,000-pound cars replaced.

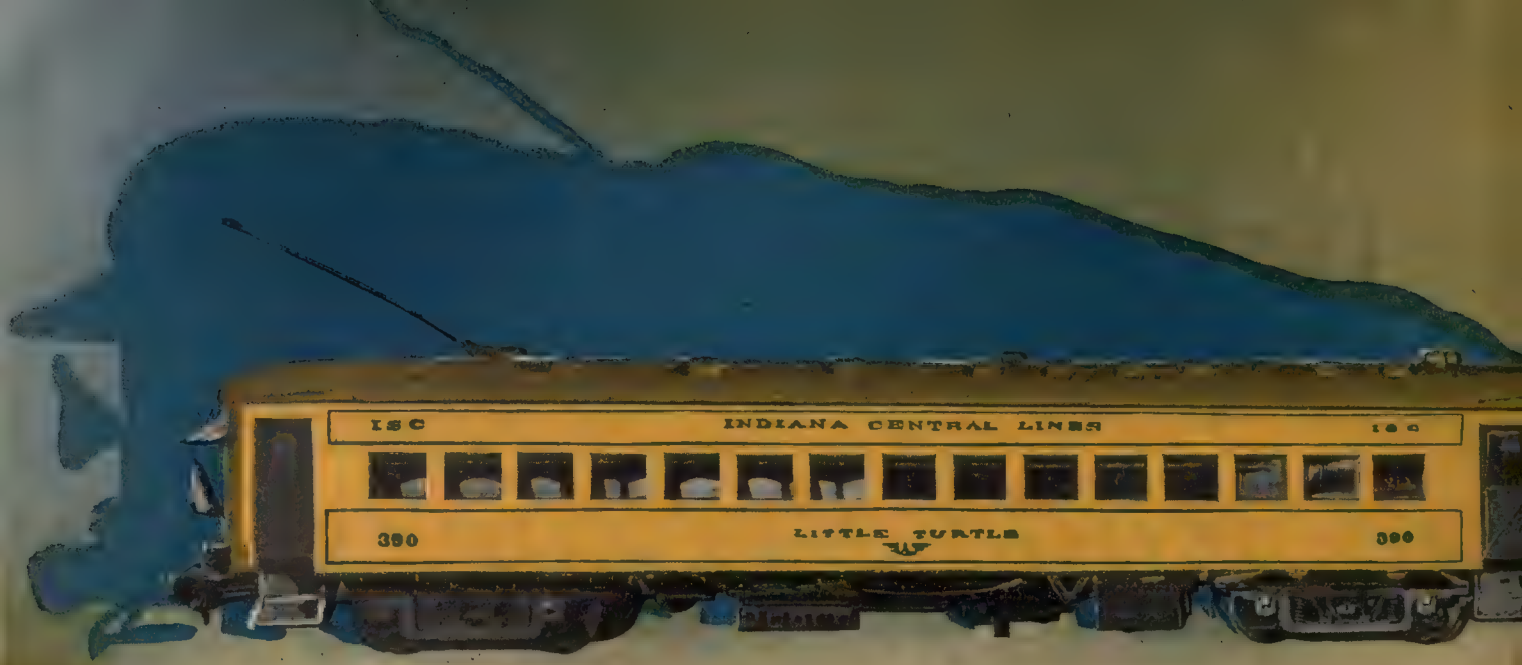
See this Car at the Convention



CUMMINGS
No. 62 TRUCK

And Coach Co.

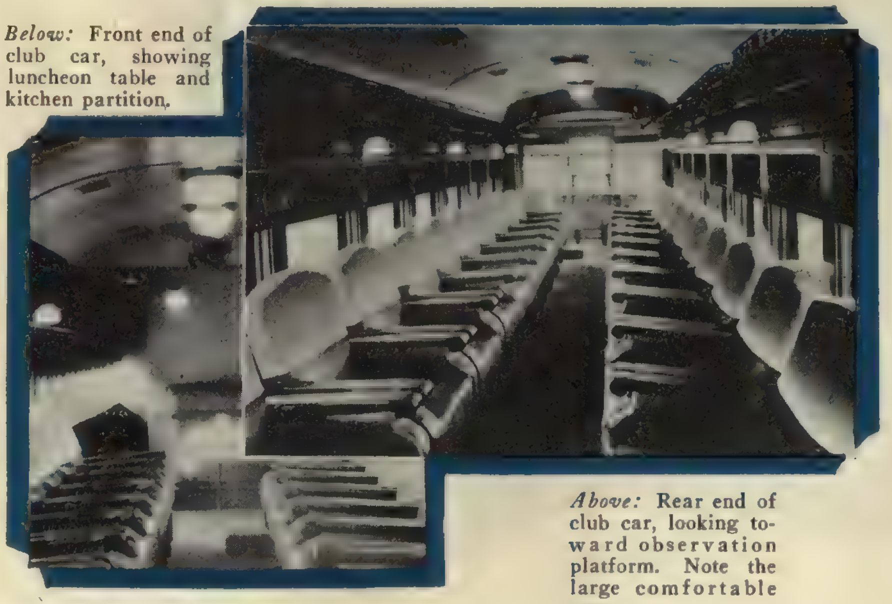
ompany, 111 W. Monroe Street, Chicago, Illinois



This IS Modern

ELECTRIC RAILWAYS have been, and will continue to be the mainstay of local transportation. Their importance as interurban and suburban carriers is noticeably increasing.

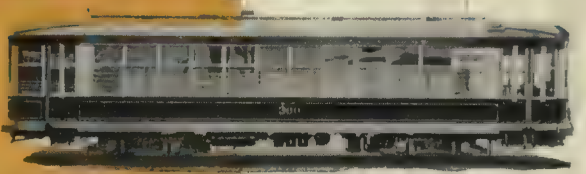
That railway operators are aware of these facts, and are desirous of making this essential utility still more attractive and valuable to the community, is evident from the character of equipment now being put into service. Of several notable orders filled by the St. Louis Car Company this year, three are especially worthy of notice. Outstanding among them are the all-steel cars furnished the Indiana Service Corporation, Ft. Wayne, Ind., and displayed at the top of these pages.

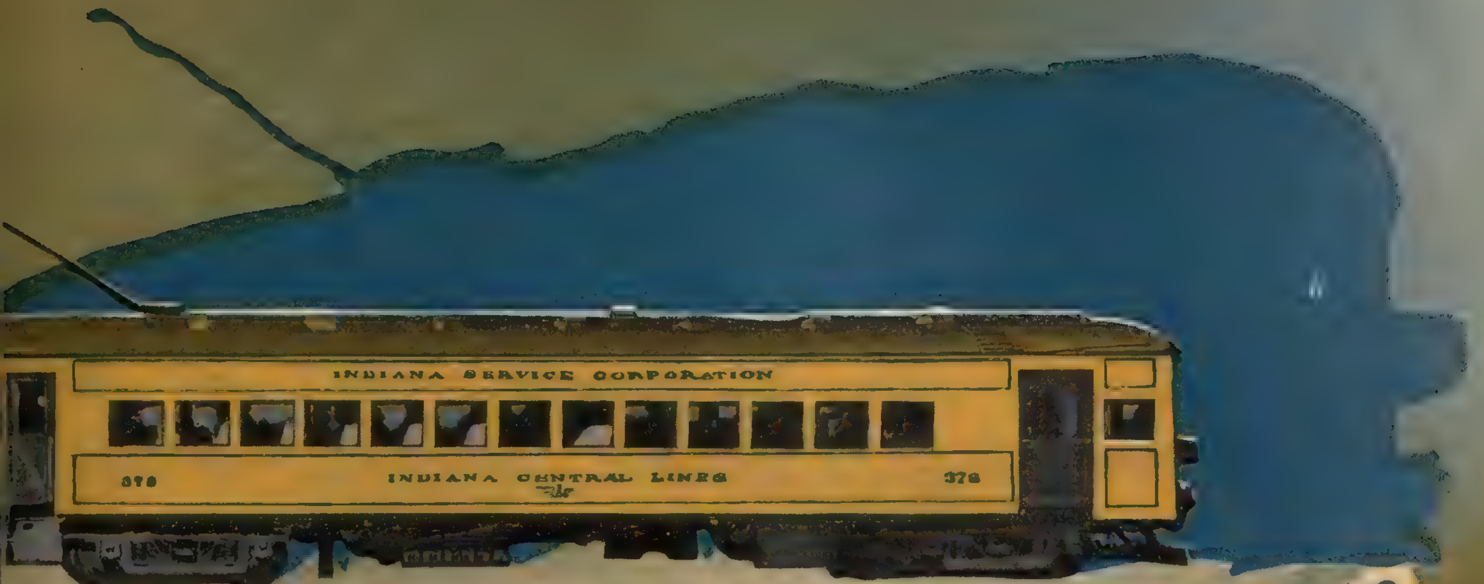


Below: Front end of club car, showing luncheon table and kitchen partition.

Above: Rear end of club car, looking toward observation platform. Note the large comfortable seats.

One of the 32 new cars recently placed in service by the Memphis Railway, Memphis, Tenn. Light weight construction for one-man operation, with automatic step treadles at exit.



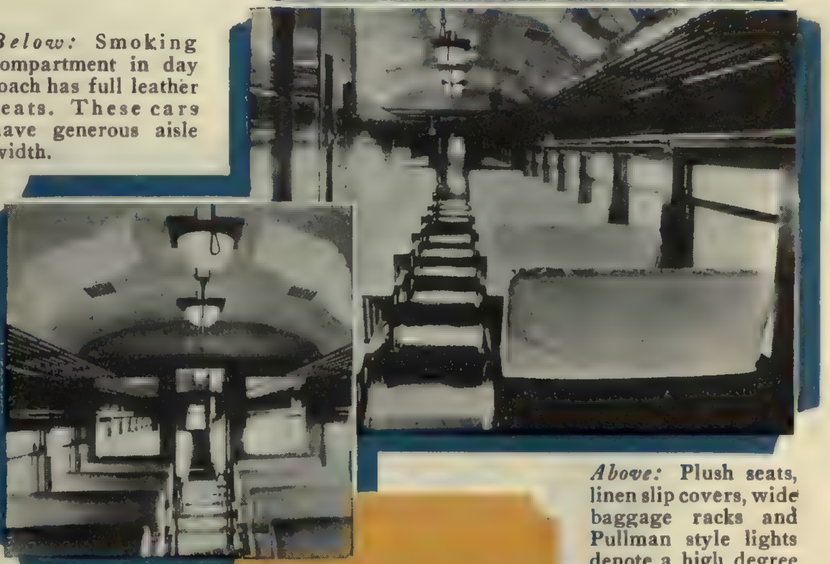


Transportation!

These cars are now furnishing high speed, de luxe transportation between Ft. Wayne and Indianapolis. In size and appointments they compare favorably with the best steam railroad equipment. Two car trains are run, the first car being baggage, smoker and day coach; the second car is a parlor or club car, having a miniature kitchen with electric range and electric refrigerator, and an observation platform. Interiors are all steel, the motor cars finished in walnut, the parlor cars in two tone green enamel. The seating equipment unusual in comfort, is entirely a product of the St. Louis Car Company. The head car is equipped with four 125 hp. motors, and is capable of speed, hauling the second car as a trailer, of 65 miles per hour. The parlor car has two motors, to be used for handling the car in terminal switching.

Engineering designing and construction can nowhere be done better than in the quality shops of the

Below: Smoking compartment in day coach has full leather seats. These cars have generous aisle width.



Above: Plush seats, linen slip covers, wide baggage racks and Pullman style lights denote a high degree of comfort.

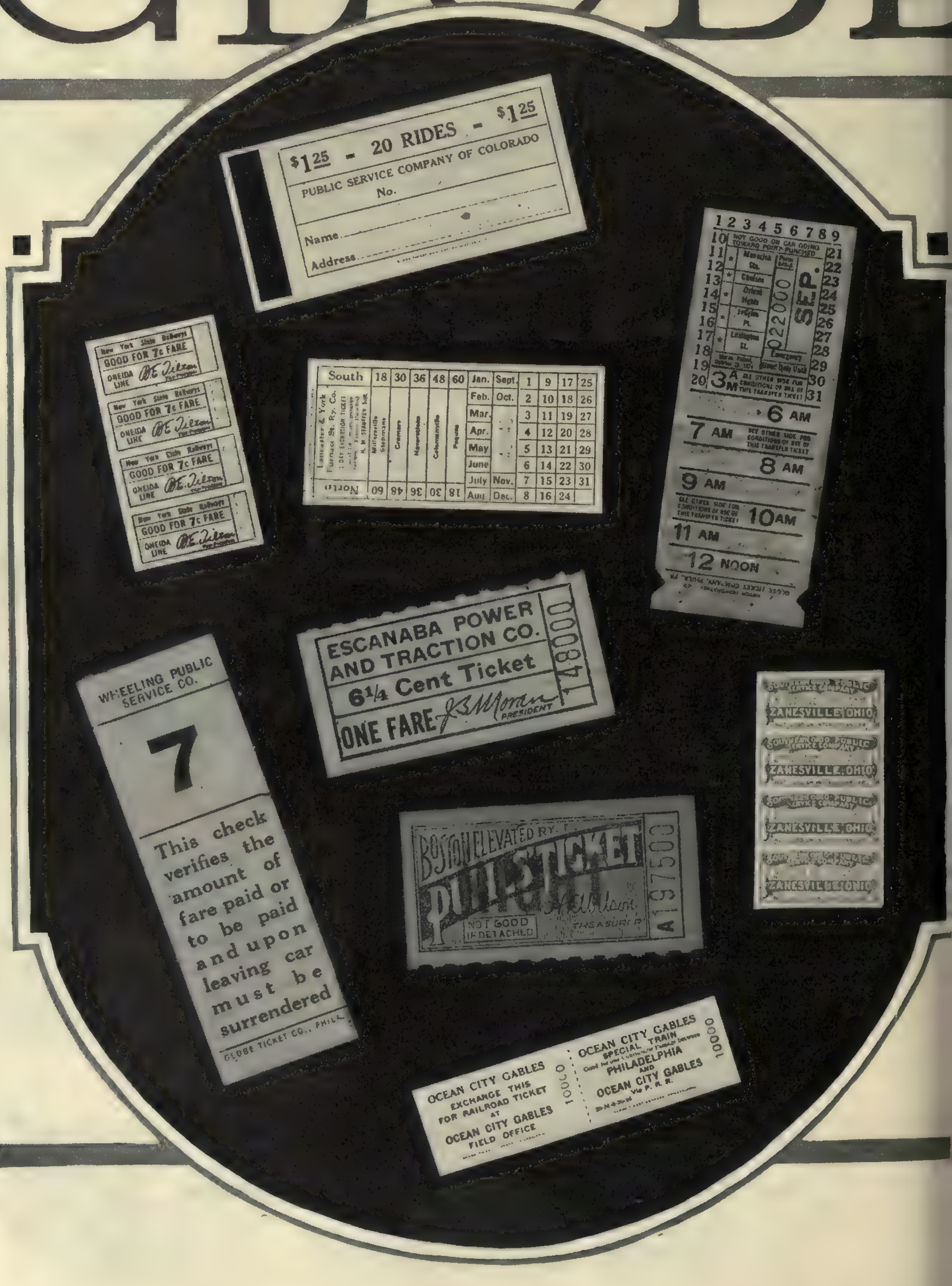
Fifteen new all-steel interurban coaches like this were recently built for the Union Traction Company of Indiana.

St. Louis Car Co.

St. Louis, Mo.,

see our exhibit
Space 105
at Cleveland

GLOBE


$1.25 - 20 RIDES - $1.25
PUBLIC SERVICE COMPANY OF COLORADO
No.
Name
Address
New York State Railways
GOOD FOR 7c FARE
ONEIDA LINE
South 18 30 36 48 60
Lancaster & York Furnace St. Ry. Co.
North
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
NOT GOOD ON CAR GOING TOWARD POINT PUNCHED
022000
SEP.
3 AM
6 AM
7 AM
8 AM
9 AM
10 AM
11 AM
12 NOON
GLOBE TICKET COMPANY, PHILA.
ESCANABA POWER AND TRACTION CO.
6¼ Cent Ticket
ONE FARE
PRESIDENT
148000
WHEELING PUBLIC SERVICE CO.
7
This check verifies the amount of fare paid or fare to be paid and upon leaving car must be surrendered
GLOBE TICKET CO., PHILA.
BOSTON ELEVATED RY.
PUPIL'S TICKET
NOT GOOD IF DETACHED
TREASURER
A197500
ZANESVILLE, OHIO
OCEAN CITY GABLES
EXCHANGE THIS FOR RAILROAD TICKET AT OCEAN CITY GABLES FIELD OFFICE
10000
OCEAN CITY GABLES SPECIAL TRAIN
PHILADELPHIA AND OCEAN CITY GABLES
Via P. R. R.
10000

TICKETS

Universally used over fifty years

Tickets in packages, strips, books—transfers, cash fare receipts, weekly passes, seat checks—for every transportation need.

That's Globe Products!

More than that. From an experience of over 50 years, they are correctly designed and numbered, perfectly printed, and promptly delivered.

That's Globe Service!

See us in Cleveland, Spaces 213 and 226.

A.E.R.A. Convention

GLOBE TICKET COMPANY

Specialists in Tickets and Checks Since 1873.

Philadelphia **Los Angeles**

ALL WAYS GLOBE THAT'S THE TICKET

SILVER LAKE TROLLEY CORD

—and Silver Lake Bell and Signal Cord have established an enviable record during more than half a century because of their tough, strong, waterproof, NON-STRETCHING and long-lasting qualities. Bell and Register Cords made in all sizes and colors.

Send for Catalogs and Samples.

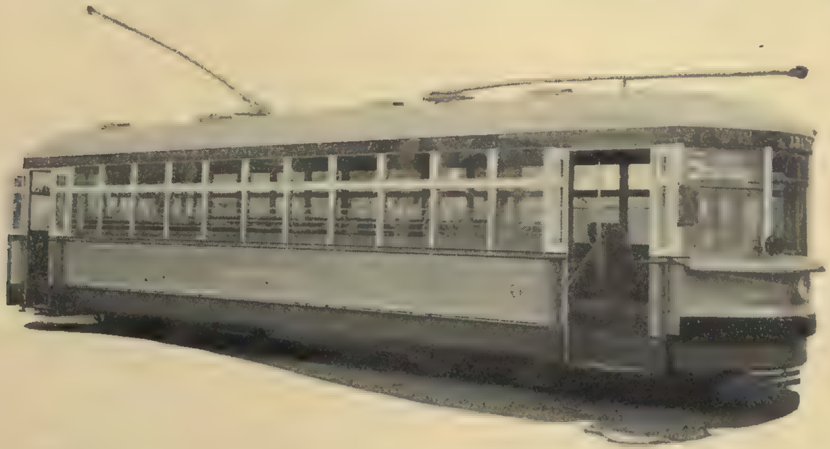
SILVER LAKE COMPANY, Newtonville, Mass.

LIGHT WEIGHT NOISELESS

ELECTRIC MOTOR COACH

Modern Cars

for Chattanooga, Nashville and Evansville



Modern Light Weight Noiseless Double End Cars for Chattanooga, equipped with Smith Light Weight Noiseless Truck.
Seats 44, Length 40 ft. 3½ in., Weight 29,000. lbs.

Beautiful—Comfortable—Attractive—Economical

Chattanooga, Nashville and Evansville Properties of Hodenpyl, Hardy & Co., replace the old-fashioned heavy street car with this modern, more comfortable and attractive conveyance.

Grand Rapids Car, "Minnesota" of this type, seating 46 passengers, has operated 43,873 miles and averaged 1.65 K.W.H. per car mile.

10 for Chattanooga—10 for Nashville—13 for Evansville

These Modern Cars Mean

- Less Weight
- Less Noise
- Less Power
- Less Maintenance
- Less Platform Expense
- Less Accidents
- Less Service Interruptions
- Less Traffic Congestion
- Less Competition
- **Less Operating Costs**

- More Seats
- More Comfort
- More Public Co-operation
- More Civic Pride
- More Interest in Street Railway
- More Regular Service
- More Safety
- More Satisfaction
- More Rides
- **More Revenue**

Manufactured by

IGHT WEIGHT NOISELESS ELECTRIC STREET CAR CO.
General Office: 1743 Illinois Merchants Bank Building
CHICAGO

LIGHT WEIGHT NOISELESS

ELECTRIC MOTOR COACH

Interior of Car "Chattanooga"

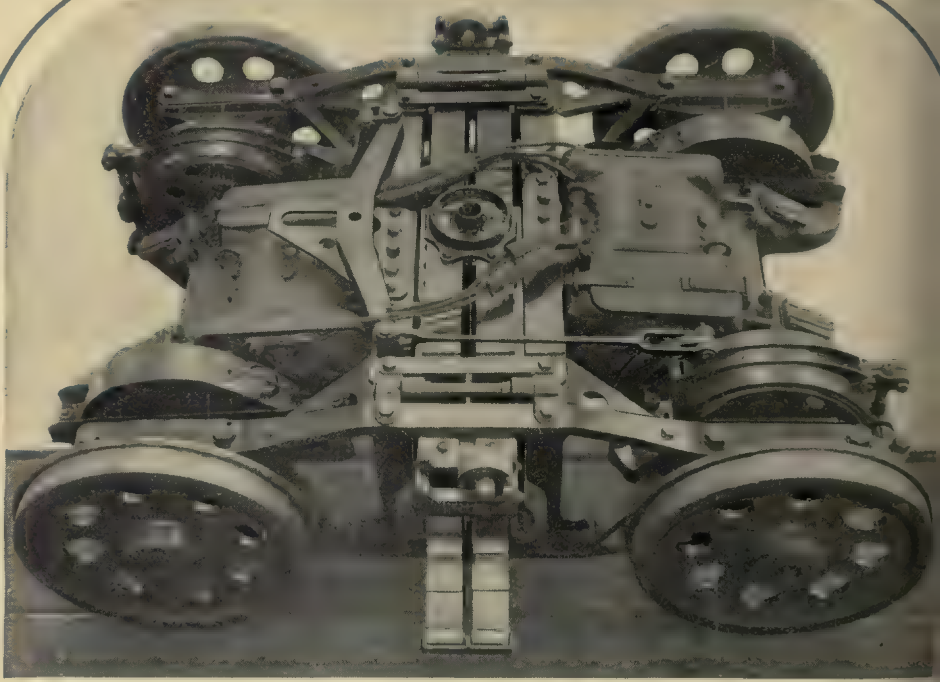
Beauty
in
Light Weigh
Design

arge Saving in Power Consumption. omplete revision of street-car truck sign on scientific lines, *producing icient and economical results,* radilly changing and improving the oldshioned street-car truck.

eat-treated steel and machined inrchangeable parts, making a *superior ıck* to any ever produced before.

quipped with *Hyatt Roller Bearings* d *concentric clasp axle drum brakes automotive type,* reducing power quired for starting, greatly improv- coasting and providing fast, effint and noiseless braking with *great- safety and power economy.*

rge Saving in wheel mileage, brake oes and car service labor for brake justment and inspection.



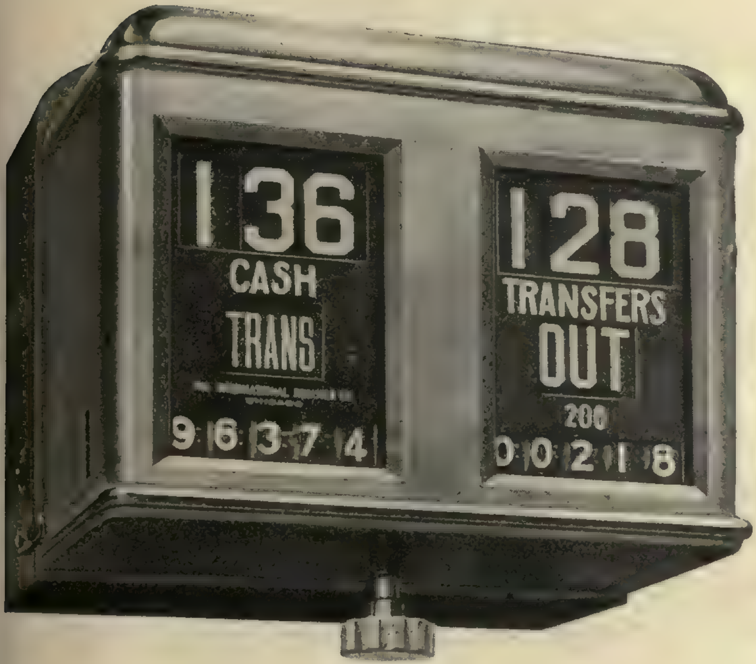
Smith Light Weight Noiseless Truck. Weight of Truck Complete, Without Motors, 3780 Pounds

Faster Acceleration, Coasting, Braking and Speed, Due to Ample Motive Power, Roller Bearings and Automobile Type of Brakes

LIGHT WEIGHT NOISELESS ELECTRIC STREET CAR CO.

General Office: 1743 Illinois Merchants Bank Building
CHICAGO

ELECTRIC FARE REGISTRATION



is in keeping with the design of Modern Cars

The trend in the design of modern Cars tends strongly toward greater operating efficiency, and greater comfort and safety for the passenger.

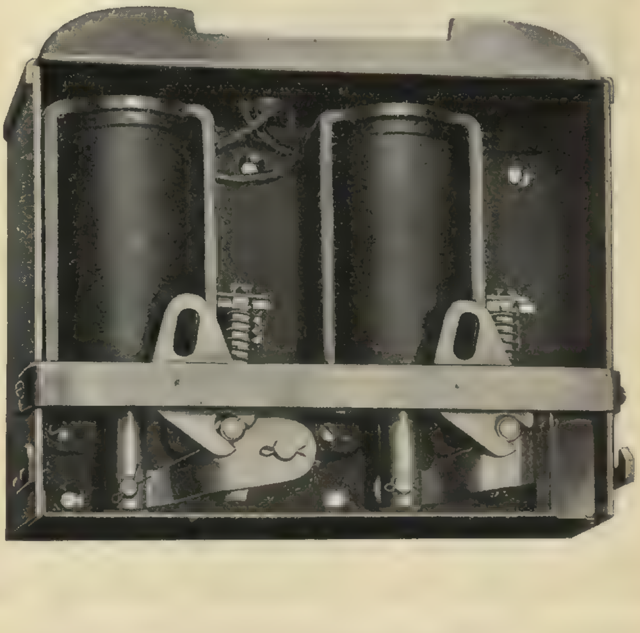
Why not carry this idea to its logical conclusion? Protect your revenue by installing International Electrically Operated Fare Registers! Electric operation is reliable, fast and simple, assuring accurate registration of all fares and transfers with the least expenditure of effort on the part of the trainman.

The electric back of the double register is equipped with two solenoids; one for the operation of the cash fare side and the other for the operation of the transfer. Both solenoids are wound for operation on 350-550 volts D.C., the register operating circuit is not broken in the register back.

The electrically operated registers, both single and double, are operated by a specially designed foot switch mounted under the platform with a pedal protruding through floor. Full pressure on foot switch pedal registers fare instantaneously and the registered fare is permanently recorded and cannot be tampered with. Mechanism is arranged so as to prevent burning of coils.

This latest device as well as a full line of International single and double registers, hand and foot, electrically and mechanically operated will be shown at our exhibit at the American Electric Railway Association Convention at Cleveland—Space 209.

The International Cutawl will be shown here in operation.



The International Register Company

15 South Throop St., Chicago

“Improved practice
greater sea
well-payin

Typical H-K Seats

—for cars

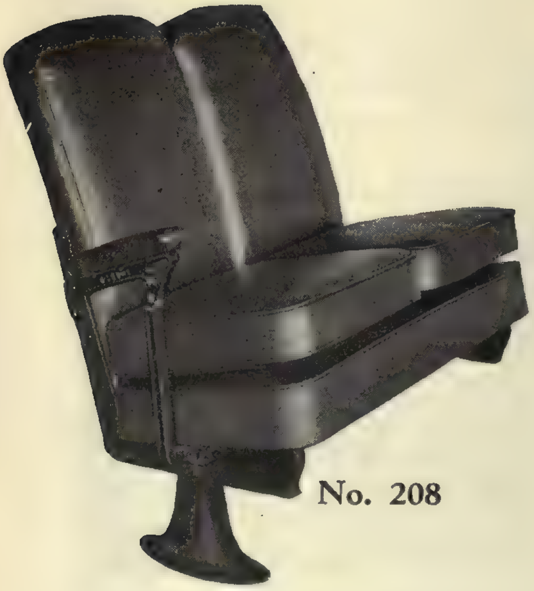
No. 392 EE—Mahogany capped armrest and extra high three-part headroll.

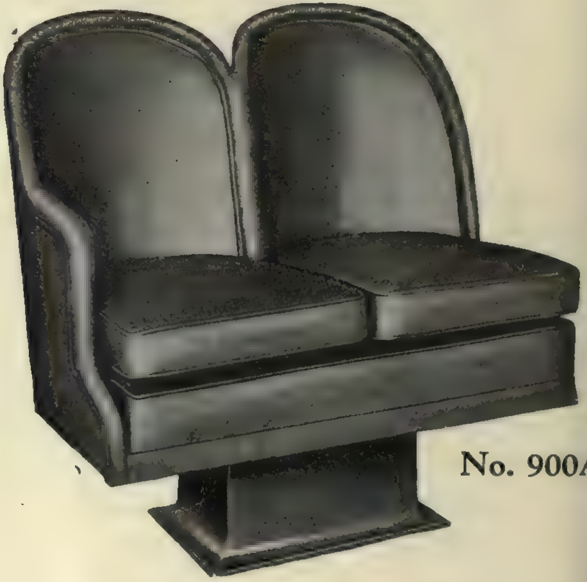
No. 199 F—Special—Plush seat with thickly upholstered spring edge cushion and detachable back.

—for buses

No. 900 A—Double chair with individual back and spring cushion pads.

No. 208—De Luxe type with divided back, spring cushion and air cushion pads.


No. 208


No. 900A

For utmost comfort in cars and buses-

the form of omfort is a vestment

SOME years ago people rode in old fashioned street cars with uncomfortable seats because there was no alternative.

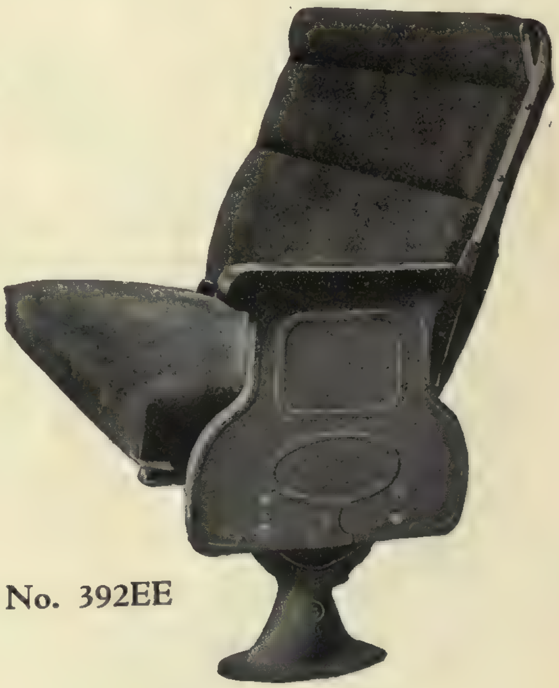
But, nowadays with taxicabs and private automobiles so common, it requires modern cars, or buses,—with the most comfortable seats to attract patronage and increase dividends.

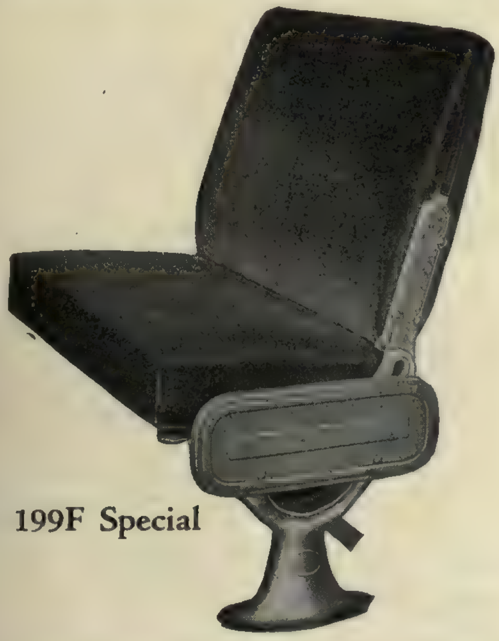
Hale-Kilburn Seats are the result of half a century's experience — durable, simple, light-weight and *comfortable.*

Literature and estimates on request.

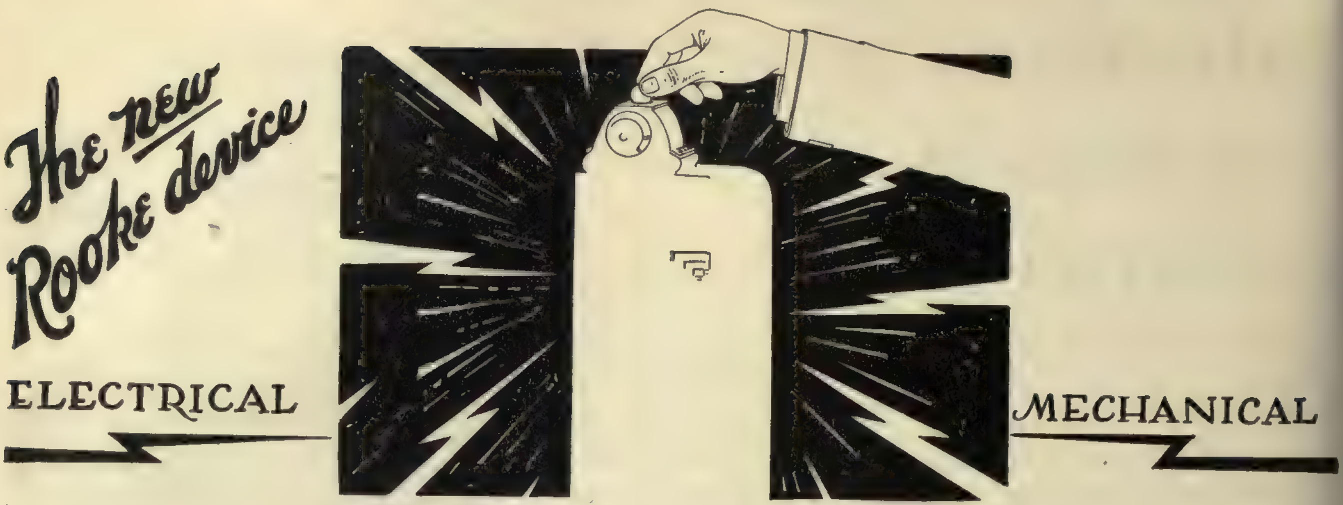
HALE-KILBURN COMPANY
General Offices and Works:
1800 Lehigh Avenue, Philadelphia

SALES OFFICES:
Hale-Kilburn Co., 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
Chris Eccles, 320 S. San Pedro St., Los Angeles
T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
W. D. Jenkins, Carter Bldg., Houston, Texas
H. M. Euler, 46 Front St., Portland, Oregon


No. 392EE


No. 199F Special

Hale and Kilburn SEATS



Electrical-Mechanical co-ordination in coin-slot Fare Collection

Doing things **electrically** always seems up-to-date. It means **power, speed** and **labor saving** when harnessed for work with other mechanisms. However, when we generalize about electricity and say, for instance, that a store cash register is "electrically operated," we should not confuse the simple functioning of a labor saving motor with the entirely independent mechanical means used to record cash transactions.

So,—when it comes to registering slot-collected trolley or bus fare, we know that electricity can speed up some fixed-point cash collecting situations, **but we also believe that all such cash should continue to be registered by mechanical means.**

The ROOKE register easily permits this electrical-mechanical team-play in this new one unit device. This company hopes to have ready for showing at the CLEVELAND CONVENTION (SPACE 123) **and for early sale at a mighty low price,** a new electric operated stand or holder device that for simplicity in its electric hook-up with the present ROOKE register, for speed, flexibility, etc., will approximate your conception of 100% efficiency.

HERE ARE SOME OF THE FEATURES OF OUR NEW PRODUCT, viz.:—

THE COLLECTING PRINCIPLE:—Instantaneous mechanical registration by the passenger. This necessarily means the familiar ROOKE coin-slot mechanism. Cash paid will always be available for operator's inspection and use. No manual labor for operator in fixed-point collecting.

COINS HANDLED:—NICKELS, DIMES, QUARTERS or METAL TICKETS (two diameters handled in tokens) in any combination, are paid into the one slot of the one register with values instantly registered on different totalizers. Fare units change and a mechanism with this large coin handling repertoire offers a larger service and permits STANDARDIZATION.

FLEXIBILITY:—The familiar 23-oz. ROOKE (the real business end of this new electric outfit) is conveniently signed out from the office. Quick auditing is possible because the mechanism used for registration is issued as man equipment and not car equipment. Passengers who remain over in car or bus for the return trip pay into the ROOKE register which is easily lifted from the electric stand and used as a portable to meet all situations where COURTESY demands this flexibility.

A break-down in either electric or mechanical equipment does not mean a "pull-in" of the car or bus. One register easily replaces another in the holder and if the "juice" is off the register is instantly removable for use as a portable. This saves no end of time and expense in routine up-keep and maintains financial efficiency.

THOUSANDS of TROLLEYS and BUSES are served by ROOKE registers used as portables or with our hand or foot-operated standard holders. The most recent installation covers the large coach fleet operated by the COMMUNITY TRACTION COMPANY of TOLEDO.

Look us up at the Cleveland Convention—Space 123—Arena Floor

ROOKE AUTOMATIC REGISTER CO., Providence, R. I.

The subject of Modern Car equipment
CAR EQUIPMENT (MODERN)

CONSOLIDATED CAR HEATING CO.

Electric Car Heaters—New Protected Open Coil Designs—
New Designs with G. E. Sheath Wire Enclosed Heating
Units—Improved Thermostatic Control Equipment—
Combination Heating and Ventilating Units—
Blast Heaters—Safety Switches—Fuse
Boxes and Resistances—High Voltage
Buzzers and Bells—
Motorman's Signal Lights—Combined
Heating and Ventilating System for Busses
Including New Carbon Monoxide Consumer—
Automatic Ventilators—Pneumatic Door Operating
Equipment—Safety Door Reversing Shoes—Safety
Cushion Shoes and Automatic Treadle Operated Doors.

Our Contribution to the Modern Car Movement

Folding Dorr Engine

Sliding Dorr Engine With Signal Switch

Visible Thermostat No. 871

Push Button No. 233-Y

High Voltage Buzzer No. 420-D

Single Stroke Bell No. 431-A

Panel Heater with G. E. Sheath Wire Heating Units

Cross Seat Heater New Protected open coil design

CONSOLIDATED

Consolidated Car Heating Co.

New York Albany Chicago

Modernization
that your public can

SEE

and
FEEL

but
CAN'T HEAR

Electric Car Heaters
through the medium

of

TRADE MARK REG. U.S. PAT. OFF.
Nichrome
The **DRIVER-HARRIS WIRE**

"Nichrome," the standard of comparison in electric heating element performance, is the resistance wire, ribbon and strip made by the DRIVER-HARRIS CO., Harrison, N. J., Morristown, N. J., and Manchester, England.
U. S. Branch Offices: Chicago and Detroit.

THE CARDS HELP THE BUYER TO SHOP AND THE MERCHANT TO SELL
THEY HAVE BECOME A REAL FEATURE OF YOUR SERVICE TO THE PEOPLE

Car Card Advertising

Collier Service
is a real feature of Your Service

Collier Service serves the buying public and the merchant as well as the transportation company and the advertiser. The car cards have become a very real help to street car patrons in the purchasing of their every day needs, and to the neighborhood storekeeper in his contact with his customers.

Thus Collier Service is a factor in *your* relations with *your* customers, a feature of *your* Service to the public.

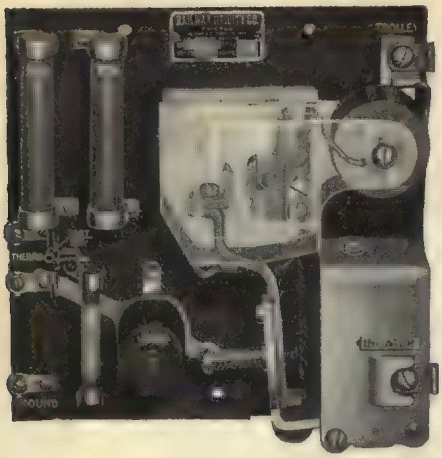
An organization to attain, and hold, such a position of general utility must have a foundation of wide experience and must exercise utmost discretion in its selection of advertising accounts.

You are cordially invited to make the Collier booth (space 104) at the A E R A Convention your headquarters. Telephone and Telegraph facilities and general information service will be at your disposal.

Barron G. Collier
INCORPORATED
CANDLER BUILDING
NEW YORK

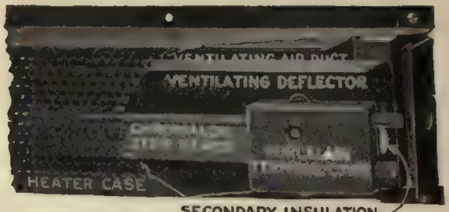
lmost everywhere!

UTILITY New Type Heat Regulator



REGULATOR PANEL

1500 Volt
Series Truss Plank
Heater



Revenue-
increase it
through proper heating and ventilating

1000 Watt
Vestibule Heater

Electric Railway executives recognize heating and ventilating as important revenue factors. Fresh air, warm cars, attract patronage.

Utility car heating and ventilating devices represent the farthest advance made in this line of endeavor. Utility heaters now employ only genuine Chromalox elements, which can be operated up to 1,400 degrees without the slightest risk of danger or deterioration. They are proof against vibration, overloads, dust, dirt, or moisture, and the heaters are so constructed that they can be installed on combustible parts of the car body just as received from the factory, without additional insulating materials of any kind. No shields are required to protect clothing or seats. All Utility Heaters carry the fire underwriters' label.

Utility Car Heating and Ventilating Devices are standard equipment for many railway properties. If you are not using them it will be to your advantage to get detailed information.

RAILWAY UTILITY COMPANY

141-151 West 22nd St., Chicago, Illinois

UTILITY
Honey Comb
Ventilators

UTILITY CAR HEATING AND VENTILATING DEVICES

TUCO

These photographs show various types of cars and buses in which Tuco Flexolith Flooring has been laid.

Tuco Flexolith has met requirements in more than 45,000 steam and electric passenger cars and is now extensively used for buses.

FLEXOLITH

Floors for Cars and Buses

TUCO FLEXOLITH Composition Floors are the result of 25 years' experience in car floor work. Flexolith Special H. W. Mixture for motor buses and electric railway cars is a special light weight product and can be used over a thinner wood floor foundation, at the same time giving increased strength. Flexolith makes a smooth, permanent floor, is fireproof, sanitary and avoids the use of floor mats and other coverings. Flexolith has a safe and pleasing non-slip tread in any kind of weather and is supplied in colors which harmonize attractively with any scheme of car or bus decoration.

A Minimum Life of Five Years

Our contract includes a five-year guarantee against maintenance due to wear or disintegration when installed under our specifications.

Make it a point to look up Flexolith at—

THE CLEVELAND CONVENTION, BOOTH 232-A

TUCO PRODUCTS CORPORATION

Executive Offices, 30 Church Street, NEW YORK

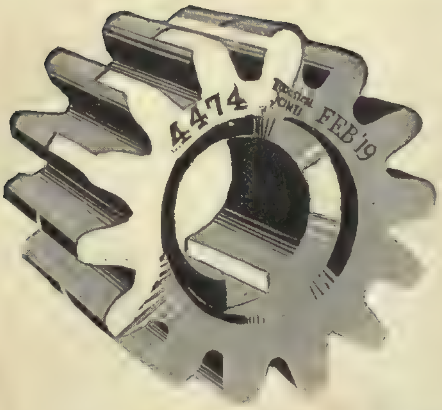
122 South Michigan Ave., CHICAGO, ILL.
915 Olive Street, ST. LOUIS, MO.
630 Louisiana Ave., WASHINGTON, D. C.
751 Monadnock Building, SAN FRANCISCO, CAL.

MONTREAL, CANADA ST. PAUL, MINN. LOUISVILLE, KY. HOUSTON, TEXAS BOSTON, MASS.

"NATIONAL"—the

Quotations always favor

A.E.R.A. CONVENTION



Tool Steel Gears

Fort Pitt
Springs

Anderson
Slack Adjusters

Tool Steel Gears & Pinions

"Tool Steel" Gears and Pinions will wear an average of 5 times as long as untreated gears and a proportionate amount longer than standard treated gears of other types.

Garland Ventilators

Designed for use on all up-to-date types of railway cars and buses.

National Hand Holds

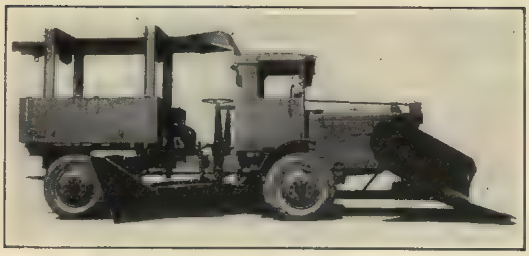
White enamelled, light, clean looking and "good for the life of the car."

Anglo-American Varnishes and Enamels

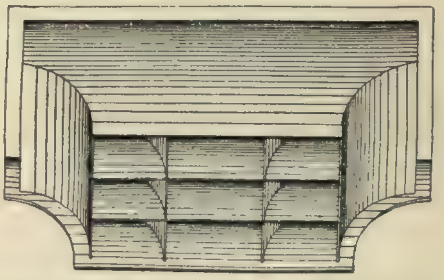
A full range of primers and finishes especially compounded for transportation service requirements.

Genesco Paint Oils

Highest quality at very reasonable prices to your specifications.



Walter Tractor Snow Plows



Garland Ventilators (Railway Type)

NATIONAL RAILWAY

B. A. HEGEMAN, Jr., President
F. T. SARGENT, Secretary

Munsey Building, Washington, D. C.
100 Boylston Street, Boston, Mass.

Grand Central Termina

Industry's Supply House

ble—Service on the dot!

XHIBIT SPACE 116—17—18

Economy Power Saving and Inspection Meters

Rugged, time tried, energy measuring devices that effect big economies under any operating conditions.

Yellow Coach Single and Double Deck Buses

All types, single and double deck, gas-mechanical and gas-electric coaches.

Walter Tractor Snow Plows

Extremely powerful snow fighting units readily adaptable to all year around service for hauling, towing, wrecking and general heavy duty work.

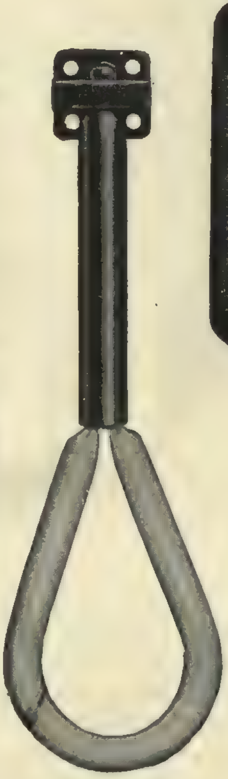
Anderson Automatic Slack Adjusters

Guaranteed to regulate and constantly maintain any predetermined travel of the live lever under all operating conditions.

Fort Pitt Springs

Coil and elliptic springs for all classes of railway transportation.

Economy
Power Saving Meters



National
Handholds

Yellow Coaches

Garland Ventilators (Bus Type)

APPLIANCE COMPANY

H. A. HEGEMAN, First Vice-Pres. and Treas.
W. C. PETERS, Vice-Pres. Sales and Engineering

52 Lexington Avenue, Cor. 45th Street, New York

Hegeman-Castle Corporation,
Railway Exchange Building, Chicago, Ill.

McGraw-Hill Building, New York

Where

McGraw-Hill has its fingers on the throbbing pulse of American Industry. Its investigators and statisticians are continually garnering facts and figures that help to make McGraw-Hill Publications vital forces in industry. In a never-ceasing stream these comprehensive data pour into the McGraw-Hill organization. Then through the McGraw-Hill Publications the information is disseminated among the particular industries to which it may apply—authoritative, virile facts on the trends and developments of industry.

Chemical and Metallurgical Engineering provides dependable statistical information for the process industries. Its weighted price index is used as an authority in Secretary Hoover's "Monthly Survey of Current Business"—in the bulletins issued by large metropolitan banks—and in leading newspapers. Manufacturers and consumers of industrial chemicals use it as a guide in charting production and consumption facts and trends. Equipment manufacturers gauge conditions by it.

Engineering and Mining Journal is the publication through which come facts and figures of vital importance to the stabilization and stimulation of the metallic and non-metallic mining industry. Its market quotations are accepted as a basis for computing contracts in the industry. And its practical information on methods and machinery for eliminating waste and increasing efficiency and profits are welcomed by its subscribers.

Electrical World was the first to collect data on the operations and the development programs of the electrical industry, and has continued to present these statistics week after week, charting in detail, thereby, the progress of this great servant industry. It also publishes each month a national and sectional barometer of activity in each of the primary manufacturing industries. This barometer is based upon reports of electrical energy consumption received monthly from almost 2,000 large manufacturing plants which consume approximately eight-billion kw.-hrs. per annum. This barometer is accepted by economists as the most timely, diversified and sensitive indicator of industrial activity available.

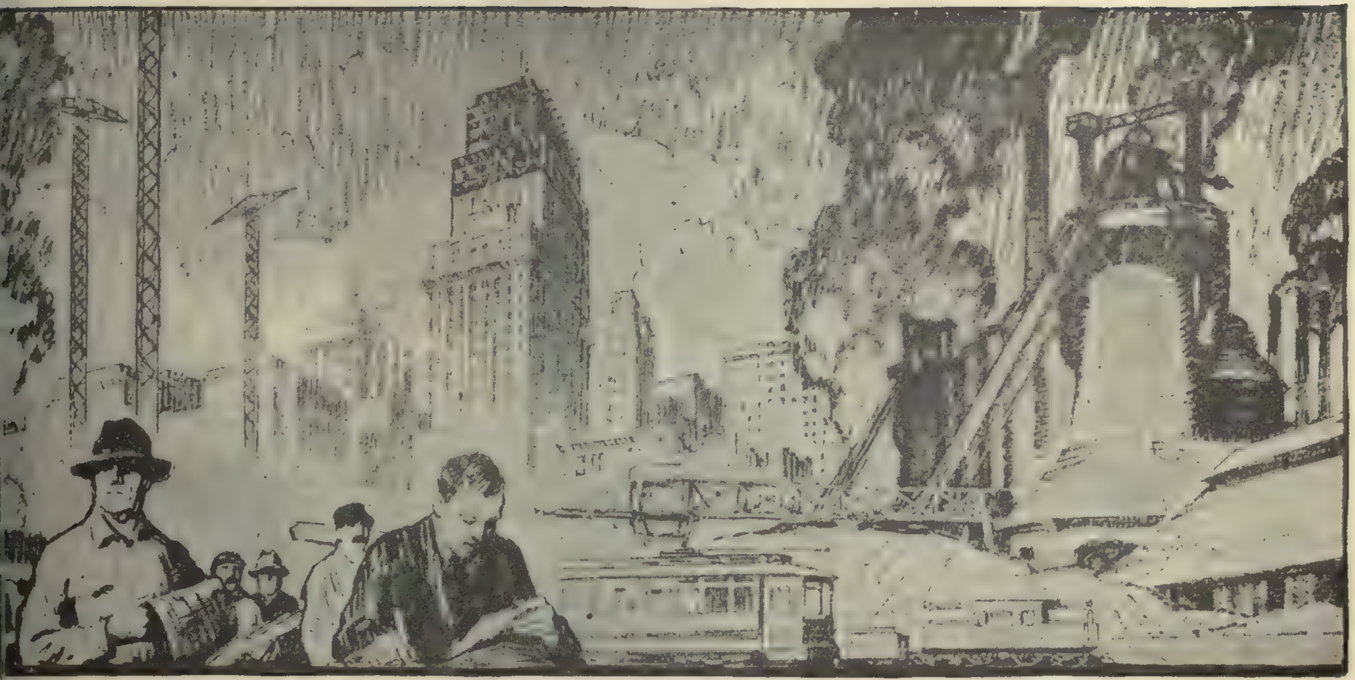
Engineering News-Record's construction cost and construction volume index numbers are the authoritative gauges in the field of industrial an engineering construction. Its compilation of value of contracts awarde the country over in the various classes of construction (a monthly servic for 14 years) gives the engineer, contractor, manufacturer of equipmen and the material dealer an accurate running account of the financial valu of the business from which they derive their living.

Approximately 15,000 sources are regularly consulted by McGraw-Hill editors, marketing counselors and statisticians in keeping McGraw-Hill data on industry and electrical and radio trade accurate and up to date.

In addition 220,000 McGraw-Hill subscribers constitute a source that is consulted from time to time for specific data relating to production and buying

41 McGraw-Hill men devote their time exclusively to collating and interpreting data for editorial presentation to McGraw-Hill subscribers and for the information of industrial advertisers.

More than 200,000 vital questionnaires are dispatched yearly from McGraw-Hill offices, many of them going to the same sources week after week and month after month in order that McGraw-Hill reports may be up to the minute. These data are published regularly in the McGraw-Hill Publications and are quoted from them regularly in 134 leading newspapers published in industrial centers.



Industry's Data Center

And so with all other McGraw-Hill Publications. Industry's ependence upon them is the logical outcome of centralizing he collective resources of the McGraw-Hill Publishing Company in obtaining information and disseminating it cientifically. It is from this storehouse of industrial data nd the experience in acquiring the facts that has come the atings of industrial markets and the formula for selling them fficiently. This knowledge is epitomized in the following McGraw-Hill Four Principles of Industrial Marketing:

> MARKET DETERMINATION—An analysis of markets or related buying groups to determine the potential of each. With a dependable appraisal of each market, selling effort can be directed according to each market's importance.
>
> BUYING HABITS—A study of the selected market groups to determine which men in each industry are the controlling buying factors and what policies regulate their buying. Definite knowledge eliminates costly waste in sales effort.
>
> CHANNELS OF APPROACH—The authoritative publications through which industries keep in touch with developments are the logical channels through which to approach the buyer. In a balanced program of sales promotion these publications should be used effectively and their use supplemented by a manufacturer's own literature and exhibits.
>
> APPEALS THAT INFLUENCE—Determining the appeals that will present the product to the prospective buyer in terms of his own self-interest or needs.

The application of these Four Principles of Industrial Marketing to your business must result in greater efficiency and lowered selling cost.

A request, either from you or your advertising agent, for a personal consulation entails no obligation.

McGraw-Hill marketing counselors are at your service, ready to show you how you can effectively use Industry's Data Center.

McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON

McGRAW-HILL PUBLICATIONS

45,000 Advertising Pages used Annually by 3,000 manufacturers to help Industry buy more effectively.

ONSTRUCTION & CIVIL ENGINEERING
ENGINEERING NEWS-RECORD
SUCCESSFUL METHODS

ELECTRICAL
ECTRICAL WORLD JOURNAL OF ELECTRICITY
ELECTRICAL MERCHANDISING

INDUSTRIAL
ERICAN MACHINIST INDUSTRIAL ENGINEER
HEMICAL & METALLURGICAL ENGINEERING
POWER

MINING
ENGINEERING & MINING JOURNAL
COAL AGE

TRANSPORTATION
ELECTRIC RAILWAY JOURNAL
BUS TRANSPORTATION

OVERSEAS
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(European Edition)

RADIO
RADIO RETAILING

CATALOGS & DIRECTORIES
ELECTRICAL TRADE CATALOG
ELECTRICAL ENGINEERING CATALOG
RADIO TRADE CATALOG
KEYSTONE CATALOG *(Coal Edition)* KEYSTONE CATALOG *(Metal-Quarry Edition)*
COAL CATALOG CENTRAL STATION DIRECTORY
ELECTRIC RAILWAY DIRECTORY
COAL FIELD DIRECTORY
ANALYSIS OF METALLIC AND NON-METALLIC MINING, QUARRYING AND CEMENT INDUSTRIES

The First Grade's Full of Them

The ones that can't improve, Stackpole can improve—but only Stackpole can improve on Stackpole.

Constant research by Stackpole engineers and chemists over a long period of years has not only solved many of the difficult carbon brush problems of the electric railway industry, but also greatly improved the uniformity and wearing qualities of the brushes regularly supplied to our customers.

Today, although the Stackpole brush is generally conceded to be of the highest quality, it is by no means the ultimate in carbon brush manufacture. To attain this goal every man in the Stackpole organization is constantly striving to make Stackpole the synonym for the highest grade, longest wearing and most uniformly made carbon brushes for every purpose.

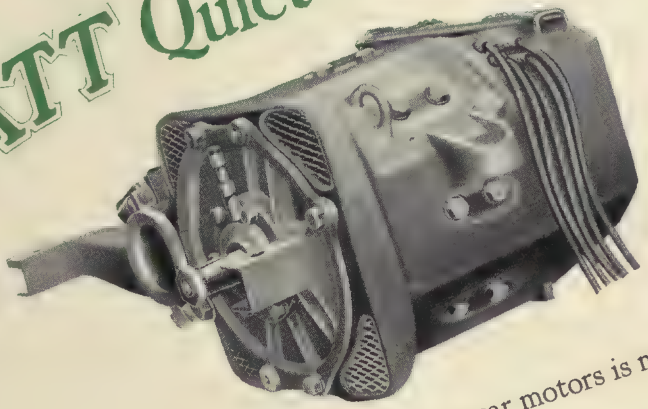
Stackpole Catalog No. 9 describes the complete line

STACKPOLE CARBON COMPANY
St. Marys Penna.

Stackpole *carbon brushes*

And for motors, too—!

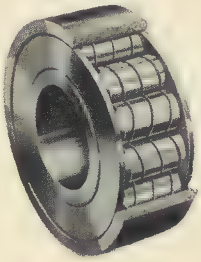
HYATT Quiet Motor Bearings



The life between shoppings of street car motors is measured in years—when they are Hyatt-equipped.

Wear is practically eliminated on bearings, armature and pole pieces. This is due to positive distribution of lubricant and effective exclusion of dirt.

Rollers and raceways are made to close limits so that there is no slap. The air gap between armature and pole pieces remains constant—and provision is made for proper end float.



Light grease lubricant—applied 3 or 4 times a year—is sealed in the bearing. It cannot seep out and rot windings.

Hyatt equipped motors in service on several properties have not been removed from the trucks in three years.

On Hyatt equipped motors, mileages of 300,000 and over have been obtained.

Let us present you with the facts.

Modern cars with Hyatt Roller Bearings

Increase Earnings

Quiet-running Hyatt Roller Bearings afford a most pleasing contrast to the discordant noises usually associated with street car operation. Public good-will is thereby built-up.

Smooth-riding Hyatt Roller Bearings make the trolley trip seem more like the pneumatic-tired automobile ride than is customary on the old-fashioned rough-riding street car.

Faster acceleration with Hyatt Roller Bearings results because starting is easier. This saves time and consequently attracts passenger traffic.

Reliable service with Hyatt Roller Bearings is a tangible result of the elimination of journal box troubles. Reliable service is an effective inducement of patronage.

Decrease Expenses

Lower maintenance with Hyatt Roller Bearings is an established fact. Less oil is required and no waste is used. Destructive dirt and grit is permanently excluded by the oil and dust-tight casing. Longer bearing life overcomes frequent replacement cost.

Power Savings with Hyatt Roller Bearings reach 20%. This is the actual reduction in kilowatt hour consumption, measured on numerous tests in various localities.

Faster acceleration with Hyatt Roller Bearings also helps to cut costs by reducing platform time as schedules are speeded up.

HYATT ROLLER BEARING CO., NEWARK, N. J.
(Division of General Motors Corporation)

HYATT
QUIET ROLLER BEARINGS

Smooth Faster Lower Standard Reliable

OHMER FARE REGISTERS indicate and record the exact amount and class of fare paid at the time it is paid. The daily printed register reports containing all details of the days business give complete protection over your income until it reaches the hands of your treasurer.

The sale of transportation is thus made to conform to the same business methods which have been proven correct in the successful merchandising of other commodities. The Ohmer System of income protection leads definitely to success in the business of furnishing public transportation.

Ohmer Fare Register Company
Dayton, Ohio, U. S. A.

ALUMINUM

CAR STRUCTURE

The use of high-strength aluminum has in some cases reduced first-cost and has always reduced weight. One pound of aluminum shows a saving of two pounds over heavier metals. The modern car is a light car . . . aluminum saves weight!

High-strength aluminum alloys are furnished in sheet, sand- and die-castings, permanent-mold castings, tubing, rivets, moulding, etc.

A. C. S. R.

Aluminum Cable, Steel Reinforced, is remarkable for its lightness, strength and great reliability in service. Having a core of steel, it is the ideal material for a main catenary or messenger cable because it combines the functions of messenger and feeder in one cable.

In A.C.S.R. the aluminum strands provide the necessary electrical conductivity and give the steel core positive and permanent protection against corrosion.

CONDUIT

Its weight is about 1-3 that of ordinary metal conduit. The 1 in. size weighs only .6 lbs. per ft.; the ½ size only .3 lbs.

100 lbs. of aluminum conduit saves 200 lbs. of weight by displacing 300 lbs. of ordinary metal conduit.

Also aluminum is unusually resistant to common corrosive agents. No paint ever needed . . . easier to install . . . and only 1-3 the weight!

Booklets sent on request cover Strong Alloys, Conduit, Paint Casting Alloys, etc. Please mention the field in which you are interested.

ALUMINUM COMPANY OF AMERICA

OLIVER BUILDING, PITTSBURGH, PENNA.

Makers of Aluminum in Every Commercial Form

Looking to the future

JUST as the anti-friction bearing was the key which unlocked the gates to automotive development, the elimination of friction is the Open Sesame to future progress in rail transportation.

SKF-marked Self-Aligning Ball and Roller Bearings eliminate dragging friction by dependable and economical revolving units that reduce friction to a minimum.

In all parts of the world, transportation systems are depending on SKF-marked bearings to keep rolling stock in constant movement over rail and road. The success attained is but an index finger pointing to the far greater achievements for those who apply present-day accepted practice in building for the future.

SKF INDUSTRIES, INCORPORATED
165 Broadway, New York City

1684

More than 100 Factory Offices Throughout the World
HESS-BRIGHT
SKF
SKAYEF
SKF
Puts the Right Bearing in the Right Place
Ball Bearings
Roller Bearings

The biggest pay-raising offer ever made to YOU!

FREE with the Library

Bishop's ELECTRICAL DRAFTING AND DESIGN—the great book you get free—tells you everything you want to know about the preparation, reading and use of all kinds of electrical drawings and diagrams.

It tells you how to handle electrical plans and blue-prints. It shows you how to put your own ideas into correct drawing form. It explains everything you want to know about reading the drawings and diagrams of others.

If you act NOW

FREE TO YOU —if you act NOW

To all who subscribe to this pay-raising set now we will give free a copy of Bishop's great book on ELECTRICAL DRAFTING AND DESIGN. This book gives you the practical facts about the construction and reading of all kinds of electrical drawings and diagrams. No man would expect to get a copy of a book like this FREE—yet here it is—FREE to you for doing now what you will do some day, for acting immediately instead of waiting until later on.

You owe it to yourself to succeed

A new year is spread out before you. Months that mean much to you—or should mean much. You owe it to yourself to advance steadily, to keep forging ahead. Don't tie your own hands—these books make promotion sure.

Croft's
Library of

PRACTICAL ELECTRICITY

8 volumes—3000 pages—2100 illustrations—flexible Keratol binding

In the eight books that make up the Croft Library will be found the essentials of a complete electrical education.

Volume One, by Palmer, contains a complete, practical course in mathematics. Volumes Two and Three present the fundamental facts and theories of electricity and its present-day applications.

Volume Four is a practical working manual covering the basic principles, operation and management of commonly used electrical machinery. Volume Five thoroughly covers modern central-station practice.

Volume Six tells how to install wiring and apparatus for practically all services under practically all conditions. Volume Seven covers the wiring of finished buildings and Volume Eight deals with the problems of electrical illumination. The man who masters the information contained in these eight standard handbooks has his future success in the electrical field definitely assured.

Modern Electrical Practice from A to Z

No course, no set of books offers a quicker, surer method of mastering electricity than the Croft Library. It is founded on practice—on work as it is actually done. It is jammed from cover to cover with the kind of hard-headed, pay-raising facts you want. Written so that the beginner can easily understand it, yet so sound, so thorough that it is the daily guide of thousands of highly paid electrical workers and engineers. Croft shows you how to master the finer points of electrical practice. He teaches you electricity as experts know it and puts you in line for an expert's pay.

Free to you—if you act NOW

You will do this for yourself some day but we'll pay you to do it now.

If you will start the new year with the Croft Library of Practical Electricity, we will give you a copy of a great book that every electrical man can use—Bishop's ELECTRICAL DRAFTING AND DESIGN.

This book gives you the most valuable kind of information about electrical drawings and diagrams—tells you how to prepare them, and how to use them to best advantage.

Every electrical man must understand the plans, diagrams and drawings that come up in his work. This book tells you all you need to know.

And it's FREE—it's FREE to you—if you act NOW.

Free examination—send no money—7c a day

We want you to test our statements—we want you to compare the Croft books with others. Fill in and mail the coupon attached and we will send you the entire set of eight volumes for ten days' Free Examination. We take all the risk—pay all charges. You assume no obligation—you pay nothing unless you decide to keep the books. Then $1.50 in ten days and the balance at the rate of $2 a month. Send the coupon NOW and see the books for yourself.

When your first payment of $1.50 is received we will send you your free copy of Bishop's Electrical Drafting and Design.

CROFT MEN WIN

PRACTICAL MATHEMATICS PALMER
PRACTICAL ELECTRICITY PART I. CROFT
CENTRAL STATIONS CROFT
WIRING for LIGHT and POWER CROFT
WIRING of FINISHED BUILDINGS CROFT
McGRAW-HILL

Invest in Yourself

The best investment you can make—the first investment you should make—is an investment in yourself.

On you alone depends what you will get out of life. On you alone depends your success, your advancement, your happiness. Invest in yourself! Can you think of any investment that will pay you as much? No investment will ever pay you more

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McGraw-Hill Book Co., Inc.,
370 Seventh Avenue,
New York.

Gentlemen: — Send me the LIBRARY OF PRACTICAL ELECTRICITY (Shipping charges prepaid), for 10 days' free examination. If satisfactory, I will send $1.50 in ten days and $2 per month until the special price of $19.50 has been paid. If not wanted I will write you for return shipping instructions. Upon receipt of my first payment of $1.50, I am to receive a copy of Bishop's ELECTRICAL DRAFTING AND DESIGN absolutely free. (Write plainly and fill in all lines.)

Name ....
Home Address ....
City .... State ....
Position ....
Name of Company ....

E. 9-25-26

Slip-proof, under all conditions, with a foot-gripping surface that is a permanent part of the step.

Miss-proof, because the ***Vizabledg*** (visible edge) marks each step clearly from those below.

Safe in all weathers, and approved by safety engineers, claim agents and others whose business is safety.

Self - cleaning — a natural foot - scraper, through which dust, dirt, mud, snow, fall and are not tracked in.

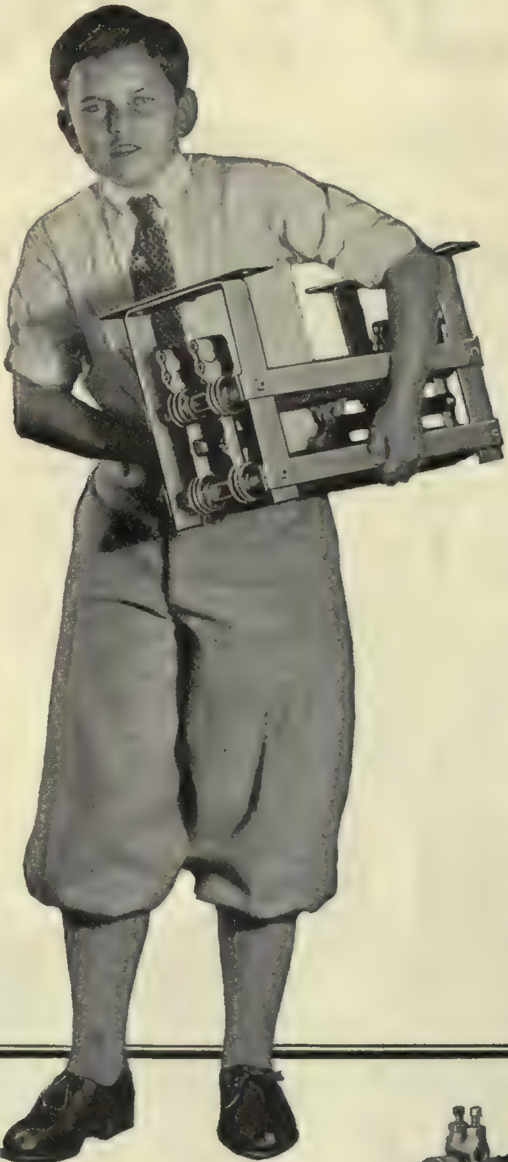
Permanent—an all-steel structure needing no maintenance beyond an occasional painting.

See it at Booth 264-A
A.E.R.A. Convention. Or
write for Bulletin D-28.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.
Established 1902

A Railway Resistor — so light a boy can carry

Dissipates 3600 watts, yet weighs only 35 lb.



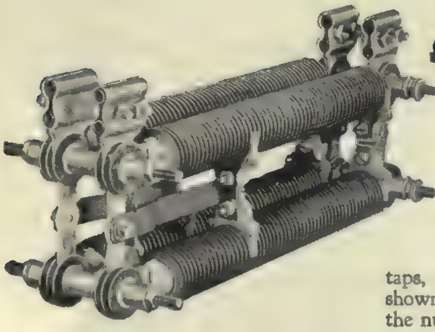
THIS Monitor Edgewound Railway Resistor, complete with frame, weighs 35 lb. It can easily be carried by a boy. A cast-iron grid resistor of the same watts rating (3600) weighs over twice as much.

Eighteen grids, connected two in multiple, compose the cast-iron resistor. Four Edgewound units, connected two in multiple, compose the Edgewound Resistor. Figure for yourself the number of joints in each case. Each joint in the Edgewound resistor is independent of the others, permanently tight, of great mechanical strength — an assurance against loose connections. Tap connections take a firm positive grip on the resistor ribbon and are adjustable at will.

THERE is not a single piece of cast-iron in the Monitor Edgewound Resistor. It is practically unbreakable. The resistance is the same whether hot or cold and there is no tendency towards localized heating (hot spots).

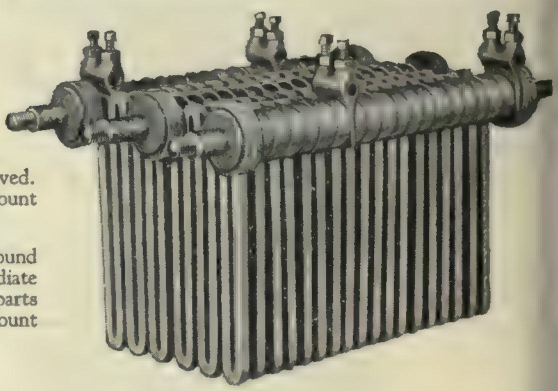
Stop resistor breakages and burnouts by replacing grid banks with Monitor Units— enthusiastically endorsed by every user. They fit the space required by cast-iron grid resistors—can be made more compact if desired.

The greater reliability and reduced maintenance that accompanies the use of Monitor Edgewound Railway Resistors warrants your thorough investigation. Ask for detailed information.



At right — 3600-watt cast-iron grid railway resistor with two intermediate taps, mounting removed. Total weight of parts shown 72 lb. Count the number of joints.

At left—3600-watt Monitor Edgewound Railway Resistor with two intermediate taps, mounting removed. Total weight of parts shown 22 lb. Weight with mountings 35 lb. Count the number of joints.

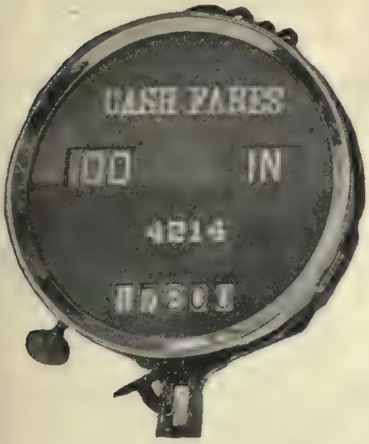


Monitor Controller Company, Gay, Lombard and Frederick Streets, Baltimore, Md.

New York Chicago Buffalo Cincinnati Detroit Pittsburgh Philadelphia St. Louis Birmingham New Orleans Cleveland Boston Washington Los Angeles San Francisco

Monitor Edgewound Resistor

6233-1



Battery of electric coin turnstiles, collecting and registering each individual fare and passing individual to train platform. Users—B-M-T, Phil. R. Tr., Pub. Serv. Ry., Boston Elevated.

Automatic visible, audible and instantaneous registering fare box. Adapted to nickels, dimes, tokens or any combination. Mere dropping of fare in slot operates it.

PEREY Turnstiles and Passimeters

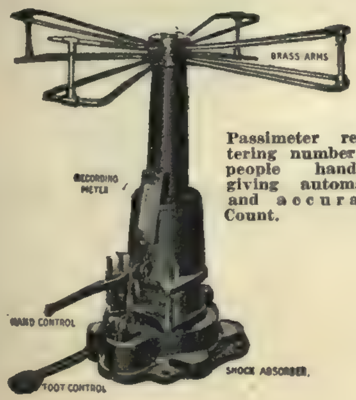
Automatic collection and registration of fares

Perey Automatic Turnstiles and Passimeters take uncertainty out of fare collection and guess out of the number of passengers handled.

Until transportation operations derive profits from income other than the humble fare, each nickel, each dime, each token collected from passengers must be accounted for. Perey equipment, by eliminating the erring human factor, assures automatic protection of income and profits.

And it's economy to use Perey equipment for attendants are unnecessary.

Modernize your fare collecting system with Perey equipment and reduce the cost of fare collection.



Passimeter registering number of people handled, giving automatic and accurate Count.

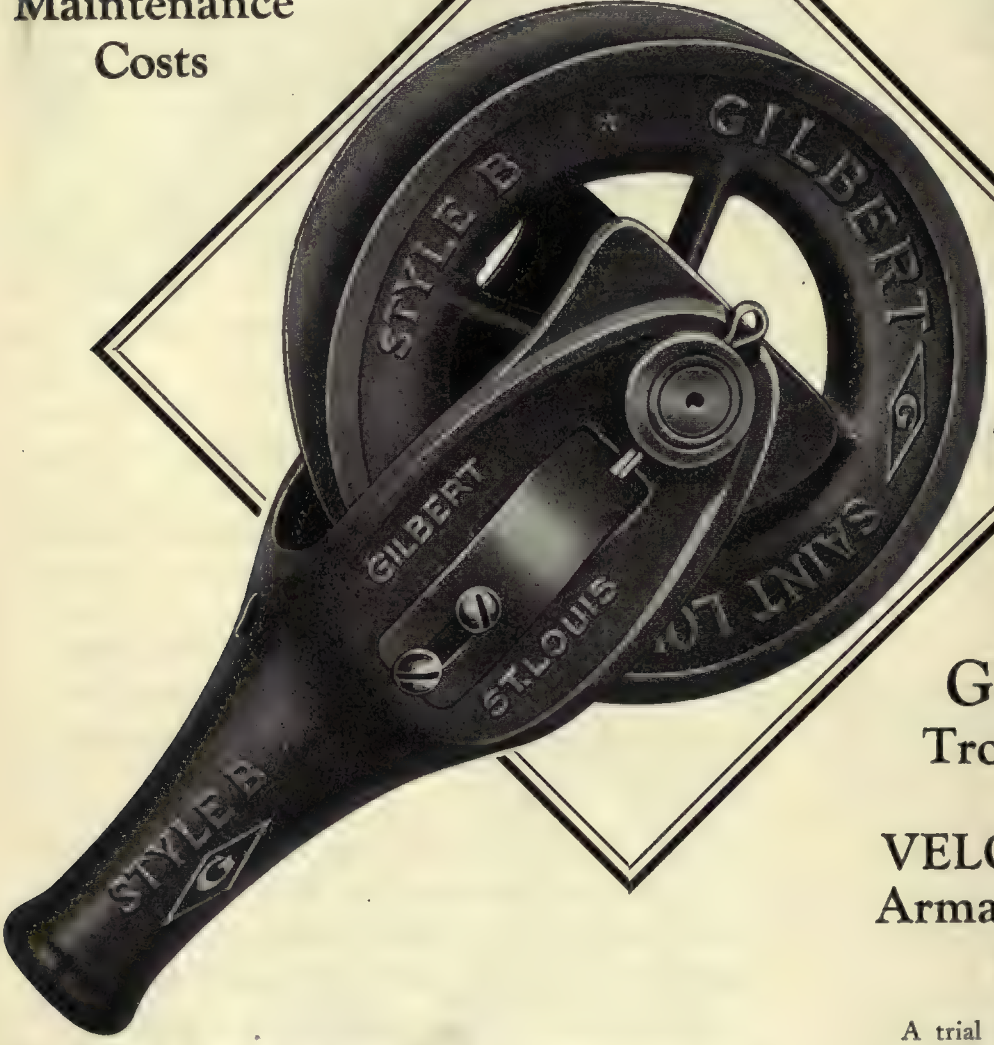
Perey Manufacturing Co., Inc.

101 Park Avenue, New York City

ADDITIONAL MILEAGE

With
Lower
Maintenance
Costs

Cheaper
Because They
Stay in Service
Longer



GILBERT
Trolley Wheels
and
VELOX BRONZE
Armature and Axle
Bearings

A trial order of Trolley Wheels or Bearings will convince the operating official of the extra service built into these products.

If you have a problem incident to these items of maintenance, our experienced engineers are yours to consult.

Our booth number at the A. E. R. A. Convention is 247.

To know the service that trolley wheel or motor and axle bearings must withstand, is to appreciate the worth of
GILBERT PRODUCTS

A. GILBERT & SONS BRASS FOUNDRY CO.

ST. LOUIS, U. S. A.

P.A.Y.U.

Electro-magnet type of fare box—NOT motor driven; no drain on battery.

The Johnson Fare Box fare collection system gets you *all* the money your passengers pay in.

Yet, you pay for the complete system only as you use it!

There's no other really good way of collecting fares, and there's no one knows so much about fare collections as our engineers —the men who have perfected individual fare collection systems for the majority of city and interurban cars running today, as well as for bus lines.

They'd be glad to help you, too. Please address Dept. 44.

Johnson Fare Box Co.
4619 Ravenswood Ave.
Chicago
2 W. 61st Street, New York

Full automatic fare box.

To make the fare collection system complete, there's a Johnson-made coin changer—best-built, to stand long usage. Sold separately, of course!

Tear out this reminder. Put it with your convention papers, and let it remind you to see the Johnson Fare Box men in Cleveland in October.

Maintenance Cost Is Less!!

EXPERIENCE in building H. B. Life Guards for many years has taught our designers the fundamentals as well as the refinements in life guard construction. The NECESSITY for MAXIMUM STRENGTH in one place, the OPPORTUNITY for REDUCING WEIGHT in some other spot, and throughout the whole assembly a DISCRIMINATING CHOICE of the MOST DURABLE QUALITY MATERIALS—these are the factors which combine to produce the most dependable life guard with the lowest maintenance cost.

The HIGH QUALITY of WORKMANSHIP and MATERIALS has NEVER BEEN SACRIFICED FOR EXPEDIENCY or price by the Consolidated Car Fender Company who have been manufacturing H. B. Life Guards for many years and take a pride in their enviable record.

IT PAYS TO GET THE BEST—so not only SPECIFY H. B. Life Guards, but insist that they be MANUFACTURED BY

THE CONSOLIDATED CAR FENDER COMPANY
PROVIDENCE, R. I.

Wendell & MacDuffie Co., General Sales Agents
110 East 42nd St., New York, N. Y.

THE CLEVELAND FARE BOX CO.
4900 LEXINGTON AVENUE
CLEVELAND, O.

W. T. COOK, PRESIDENT
W. SHAW, VICE PRESIDENT
V. G. ROSS, TREASURER

MANUFACTURER'S DISTRIBUTORS

"STEEL-STRONG" COIN AUDITING MACHINES

MATTHEW'S TOKENS

"RAPID READY" CHANGE CARRIERS

Mr. General Manager:

Again we are to have the pleasure of meeting you at the A.E.R.A. Convention, this time in the "Fifth City." You will be interested in its spirit of progressiveness, its diversified industries; you will enjoy the friendly spirit of its people and its beauty. It produces almost everything that goes into a modern electric railway system. Welcome to Cleveland!

We will occupy Space No. 207. Drop in and let us talk over that fare collection problem of yours—we may be able to give you its solution. A full line of fare boxes, coin auditing machines, change carriers and tokens will be on display.

Something new? Sure! we have given a year's intensive study to fare boxes for busses and will offer for your inspection a fare box that will not be affected by rough roads or engine vibration.

The manager of our Canadian Branch will be on hand to welcome visitors from that country.

Cordially yours,
THE CLEVELAND FARE BOX CO.

WS:AJM

Better Operation

Know this about More-Jones Trolley Wheels:

They are finished and bored in one operation, thus insuring proper balance.

The Metal used is exceedingly tough—an alloy of purest new metal, having maximum conductivity—which provides greater mileage without damage to the overhead lines.

V-K Oil-less Wheels for City and Suburban service and More-Jones lubricated Wheels for high speed requirements insure lowest ultimate cost.

"Tiger" Bronze Axle and Armature Bearings

The Lead content, that we scientifically incorporate into this alloy, minimizes frictional wear, resulting in less frequent replacements.

Finished oversize or undersize to a perfect running fit with your shafts. Expertly machined in strict accordance with your specifications, even to the extent of incorporating special features therein, if so desired.

All Armature Bearings lined with our celebrated ARMATURE Babbitt Metal.

"Tiger" Bronze Axle and Armature Bearings insure maximum service under the hardest operating conditions.

More-Jones ARMATURE Babbitt Metal

Standard on the majority of Electric Railway Systems of this country.

Specially formulated for the exacting requirements of Electric Railway Armature Bearing maintenance.

Its high heat radiation minimizes friction, even under the most trying circumstances.

A trial is the most conclusive proof of its superior inherent characteristics.

More than 5

Less Maintenance

Discriminating buyers are turning to our products by the score, realizing the false economy of applying inferior maintenance material—with labor and shopping costs such a predominating item.

Over half a century co-operation with large and small systems of the country places us in a pre-eminent and enviable position to satisfactorily and economically handle all phases of this equipment upkeep.

Let us give you further information and prices. Prompt shipments guaranteed.

MORE-JONES BRASS & METAL CO.
ST. LOUIS, MISSOURI

MORE-JONES
QUALITY PRODUCTS

years of Service

"See Those Colored Spots? It's Samson Spot Cord."

Identified—*for a long life of service*

You can tell it at a glance by the colored spots, in any color—our trade mark. Samson Spot Trolley Cord is particularly adapted to use with trolley catchers and retrievers, because of its smoothness of braid and uniformity of size. It is waterproofed by a special process, which makes it impervious to moisture and prevents shrinking and swelling.

SAMSON SIGNAL CORD

Solid braided of extra quality cotton yarn, exactly the same quality as Samson Spot Cord. Runs easily over the supports with little abrasion. Is strong, smooth, pleasant to handle, and can be furnished in any reasonable length. We carry white, mahogany and drab in stock; other colors to order.

SAMSON WIRE CENTER SIGNAL CORD

Mahogany. No. 6 and No. 8

Same as Samson Signal Cord, but braided over a galvanized wire center. This prevents stretching.

Galvanized Wire Center

Made by

SAMSON CORDAGE WORKS

88 BROAD STREET BOSTON, MASS.

TRADE MARK

Griffin Wheels

with
Chilled Rims
and
Chilled Back of Flanges

Safety and Economy are Important Factors in Electric Railway Service.

The use of Griffin Chilled Car Wheels insures minimum cost per 1000 miles' service.

GRIFFIN WHEEL COMPANY

410 No. Michigan Ave. Chicago, Ill.

Foundries:

Chicago Detroit Denver St. Paul Boston
Tacoma Kansas City Los Angeles Salt Lake City Council Bluffs

More Mileage per Motor Bearing

A motor will stand what its bearings stand—and no more. It will last as long as its bearings—and no longer. Motor ability is limited by bearing ability.

The simple, rugged ***"Hoffmann"***—with its big, solid rollers and heavy races of hardened, heat-treated alloy steel, and with its unmatched precision—has that big reserve of strength and endurance which stands up under the heaviest loads and hardest service of severe traction duty.

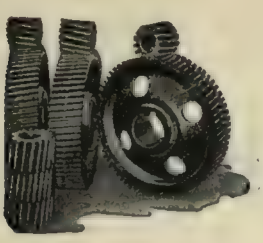
With dust-and-water-tight mounting and magazine lubrication, it is practically trouble-proof and neglect-proof.

NORMA-HOFFMANN BEARINGS CORPORATION
Stamford — Connecticut
PRECISION BALL, ROLLER AND THRUST BEARINGS

Our engineers will be glad to meet you, and demonstrate the ***"Hoffmann"*, at** Booths 273A and 274A, A.E.R.A. Convention.

"HOFFMANN"

PRECISION ROLLER BEARINGS



Always the same reply!

The following is part of a discussion on gears had at the meeting of Electric Railway Association of Equipment Men—Southern Properties—held at Chattanooga, Tenn., July 29, 1926:

MR. SILVUS: (Supt. of Equipment — Texas Electric Railway, Dallas, Texas)	"Mr. President—in connection with this subject of gear lubrication, I might say we have gears still in service since 1913 and they look like they will run 13 years more."
PRES. McWHORTER: (~~General~~ Supt. — The Memphis Street Railway —Memphis, Tenn.)	"What gears are they, Mr. Silvus?"
MR. SILVUS:	"TOOL STEEL"

(Note: No other make of gear was mentioned in this discussion.)

Have you noticed?

Any time, anyone, before any convention, has ever bragged of fine pinion records — the pinions always happen to be

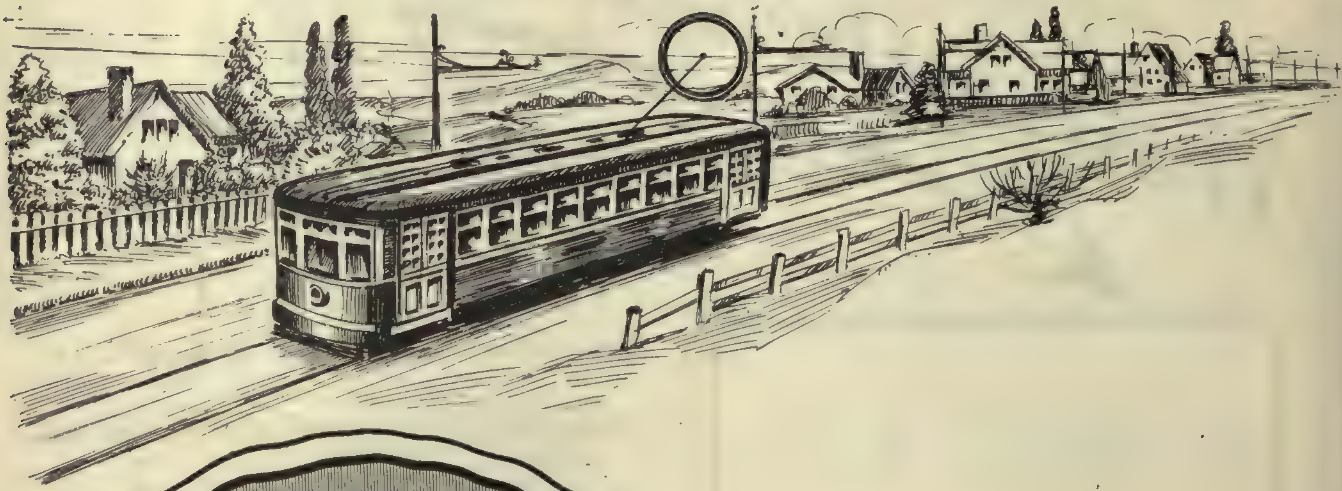
Cincinnati "Tool Steel"?

And yet we are told other pinions are "just as good"!

Tool Steel Quality

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio

Whether it's
high speed in the suburbs—



MILLER
TROLLEY
SHOES

arp curves in the cities they cling close to the wire

HOLDING firmly against the wire at all times and under all conditions gives Miller Trolley Shoes certain advantages which increase both economy and safety of operation.

To accomplish these results the Miller Trolley Shoe has a full 3-inch sliding contact surface which reduces wire wear, reduces shoe wear, eliminates lubrication, prevents arcing and increases the amount of current drafts efficiently handled.

Among the many prominent roads using Miller Trolley Shoes are the Northern Texas Traction Co., the Interstate Public Service; the Hudson Valley Ry. Co., the Chicago, North Shore, Milwaukee R.R., the Waterloo, Cedar Falls & Northern Ry. Co., and the Portland-Lewiston Interurban.

Let us cooperate with you for a trial under your own conditions—and let us send you additional data about the Miller Trolley Shoe performance. Just send us your address.

Miller Trolley Shoe Company
295 Columbia Road
Boston 21, Mass.

Chicago, North Shore, Milwaukee R. R.

Hudson Valley Ry. Co.

Portland-Lewiston Interurban

—from de luxe interurbans t

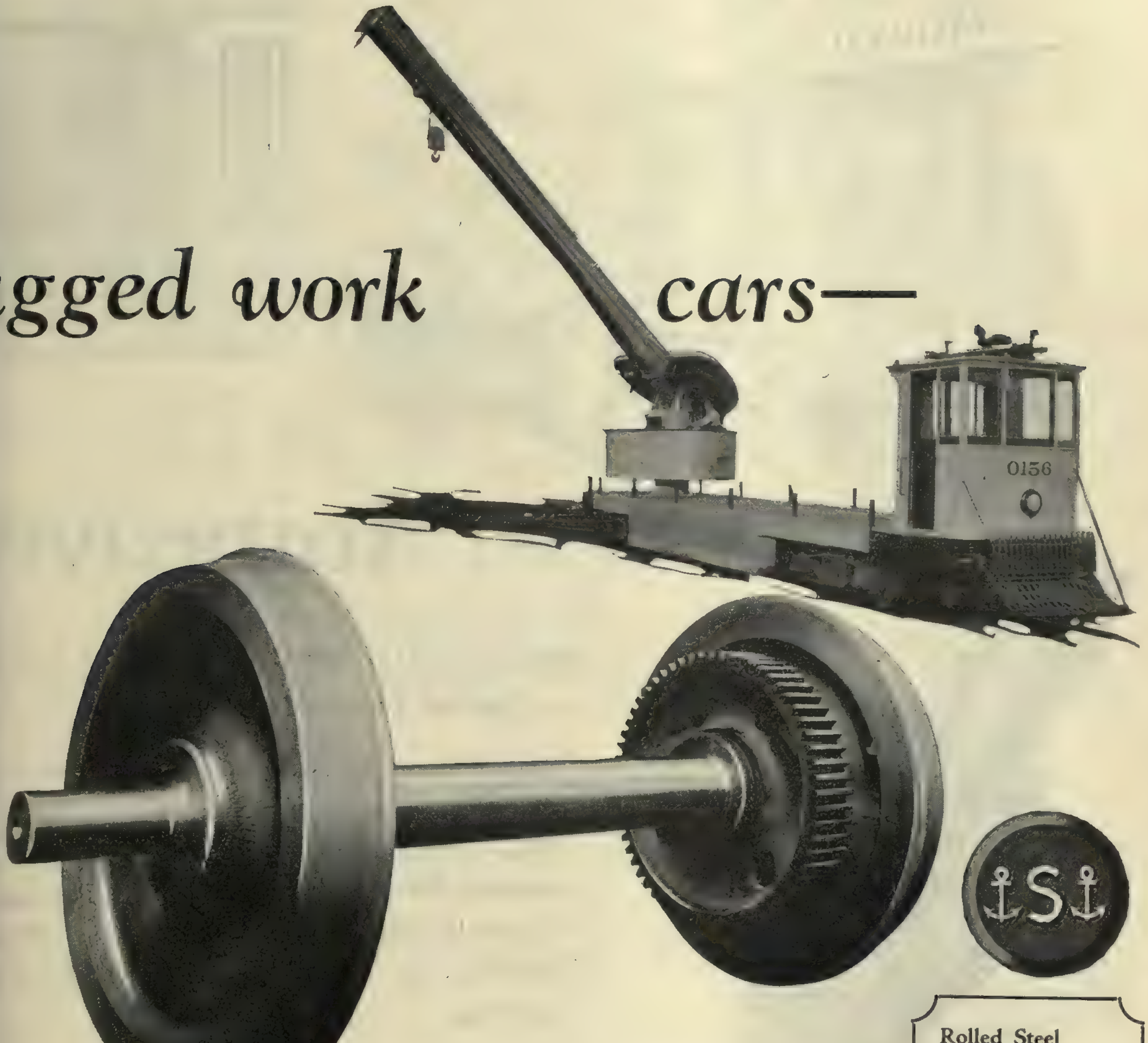
STANDARD

ROLLED STEEL WHEELS
on railways serving
CLEVELAND

Shown above is the "Cleveland Limited" of the Northern Ohio Traction & Light Company. At the upper right is a Differential Crane Car of the Cleveland Railway Company. Both are equipped with "STANDARD" Rolled Steel Wheels.

"STANDARD STEEL" Products are made for every type of car. For full particulars.

SEE OUR EXHIBIT—SPACE 215-A



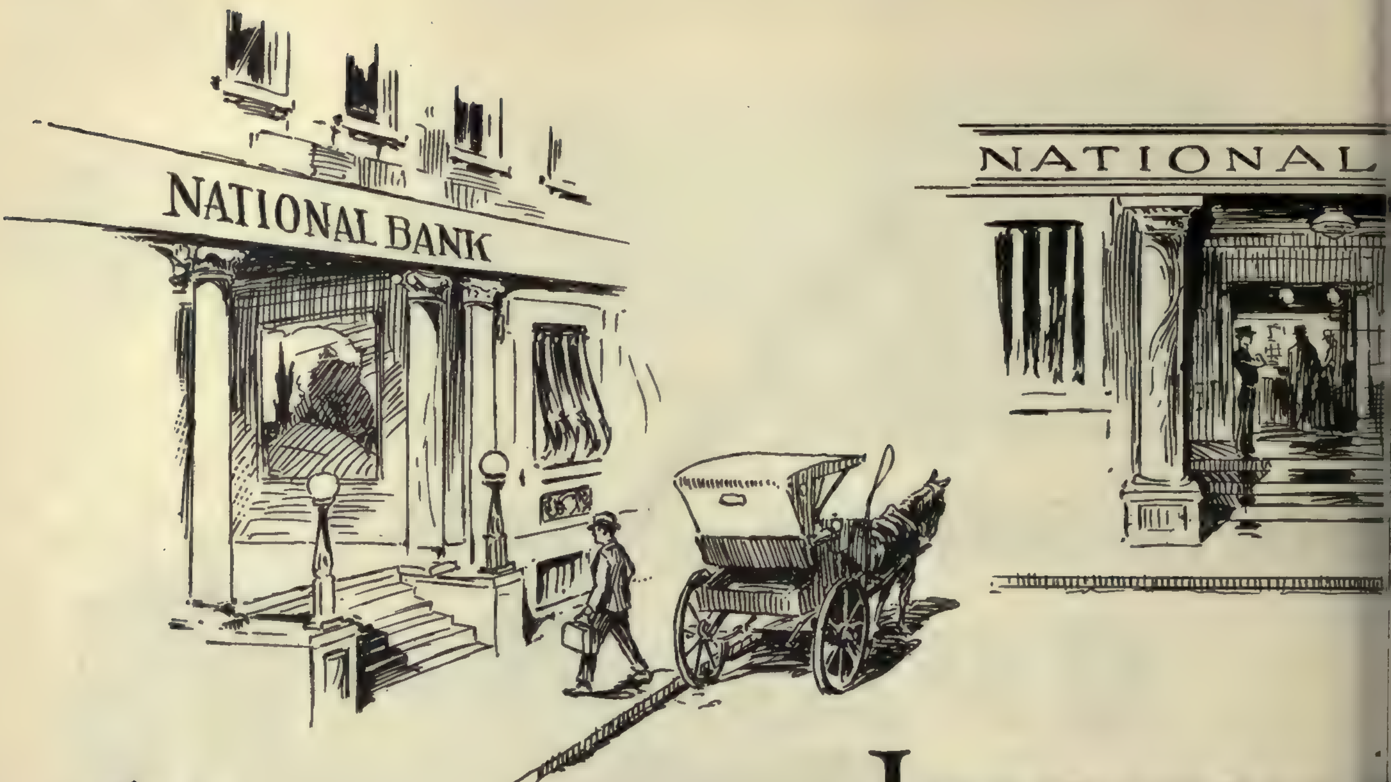
ugged work cars—

Rolled Steel Wheels
Quenched and Tempered Carbon Steel Axles
Armature Shafts
Coil and Elliptic Springs

See Our Exhibit Space 215-A

STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.
BRANCH OFFICES:
CHICAGO
ST. LOUIS
NEW YORK
HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.
SAN FRANCISCO
ST. PAUL, MINN.
PITTSBURGH, PA.
WORKS: BURNHAM, PA.



Improvec

Some items Selected from a long list of Boyerized Products

- Brake Pins
- Brake Hangers
- Brake Levers
- Pedestal Fulcrums
- Center Bearings
- Side Bearings
- Bushings
- Spring Post Bushings
- Spring Posts
- Bolster and Transom Chafing Plates
- McArthur Turnbuckles
- Manganese Brake Heads
- Manganese Truck Parts
- Bronze Bearings

"Boyerize to economize"

The McArthur Turnbuckle

By replacing the old-style jam-nut idea with an efficient spring-equipped, split-clamp principle, only a small pocket wrench is required to make an adjustment that will "stay put."

rotection pays!

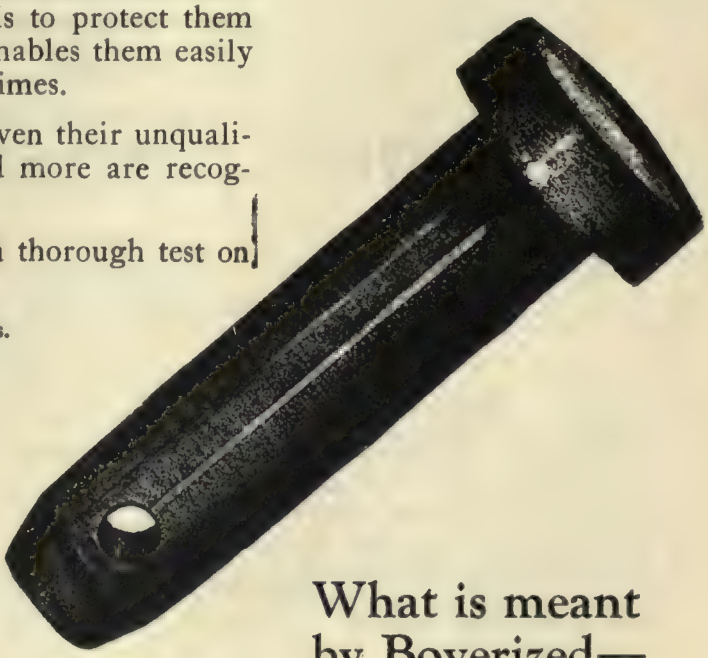
In former days even very large sums of money were transported by a lone messenger who was inadequately protected against the assaults of determined robbers. But nowadays armored automobiles and three or four armed messengers carry money about with a high degree of safety.

Likewise car parts used to be put in service without proper protection so that they were soon made victims of the wears-and-tears. The popular present-day method, however, is to protect them by the Boyerizing Process. This treatment enables them easily to outlast ordinary steel parts three to four times.

Many of the largest electric railways have given their unqualified approval to this protective method—and more are recognizing its merits every day.

To find out why, give Boyerized Car Parts a thorough test on your road.

We will gladly submit quotations on your requirements.
Write today.



Bemis Car Truck Company

Electric Railway Supplies
SPRINGFIELD, MASS.

REPRESENTATIVES:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Oregon
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

What is meant by Boyerized—

This is a special process and service that enables Boyerized Products to stand the gaff of the hardest usage.

EARLL Catchers and Retrievers—

"Catch trouble
before it starts.
Retrieve profits
before they're lost"

Protection
guaranteed five times—

First by the No-Wear check pawl that always strikes *full face* on,—never misses, never upsets or wears either the end of pawl or the teeth the pawl engages.

Then by the Free-Winding Tension Spring that handles *wet rope* as easily as dry,—for quick, positive action in any weather.

Then by the Ratchet Wind to make retriever rewinding easy and safe.

Then by an Emergency Release that permits of the trolley being run up *instantly* when necessary.

And finally by a perfect automatic oiling system,—lubricating every part with one "shot," in one hole, *once* in three months.

These, in short, are the practical advantages built into Earll Catchers and Retrievers.

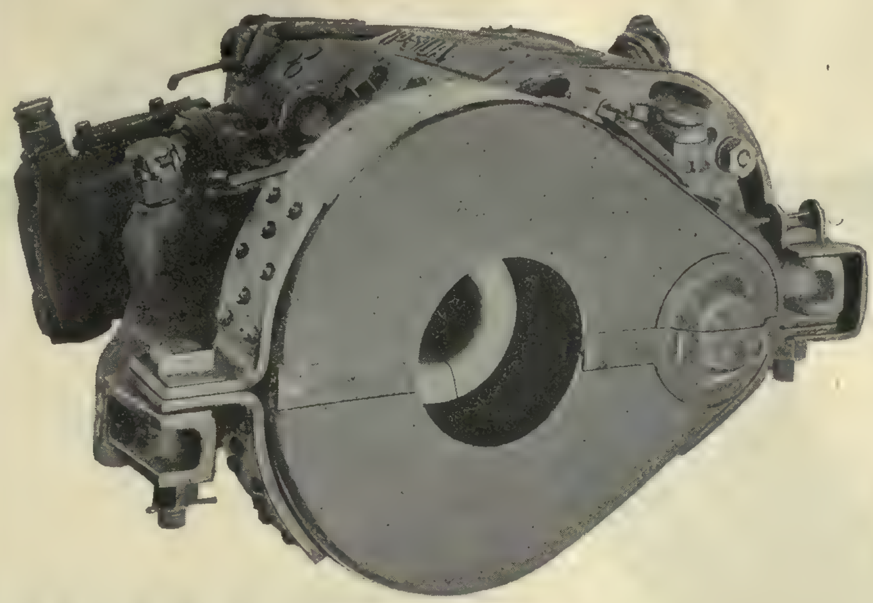
C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

BOOTH
259-a
A.E.R.A. Convention
Cleveland

A well-known master mechanic said of the Ratchet Wind, "If it took ten more operating parts to produce it, the result would be ample justification, but actually it is accomplished in the Earll Retrievers with fewer parts than the continuous-pull winding-mechanism of other retrievers."

See our exhibit at the convention.



W. H. 510-A Motor

Gears lead a dog's life—give them utmost protection

Only in that way can you get satisfactory gear and pinion mileage. That's why the gear case needs consideration.

The one-piece construction of Chillingworth Drawn Steel Seamless Gear Cases, with *overlapping* joint between the two halves, absolutely prevents the entry of dust or the escape of grease. There are no seams to open up. They therefore *give utmost protection to gears.*

Furthermore, Chillingworth Gear Cases combine light weight with great strength and toughness—the essentials that make for low maintenance.

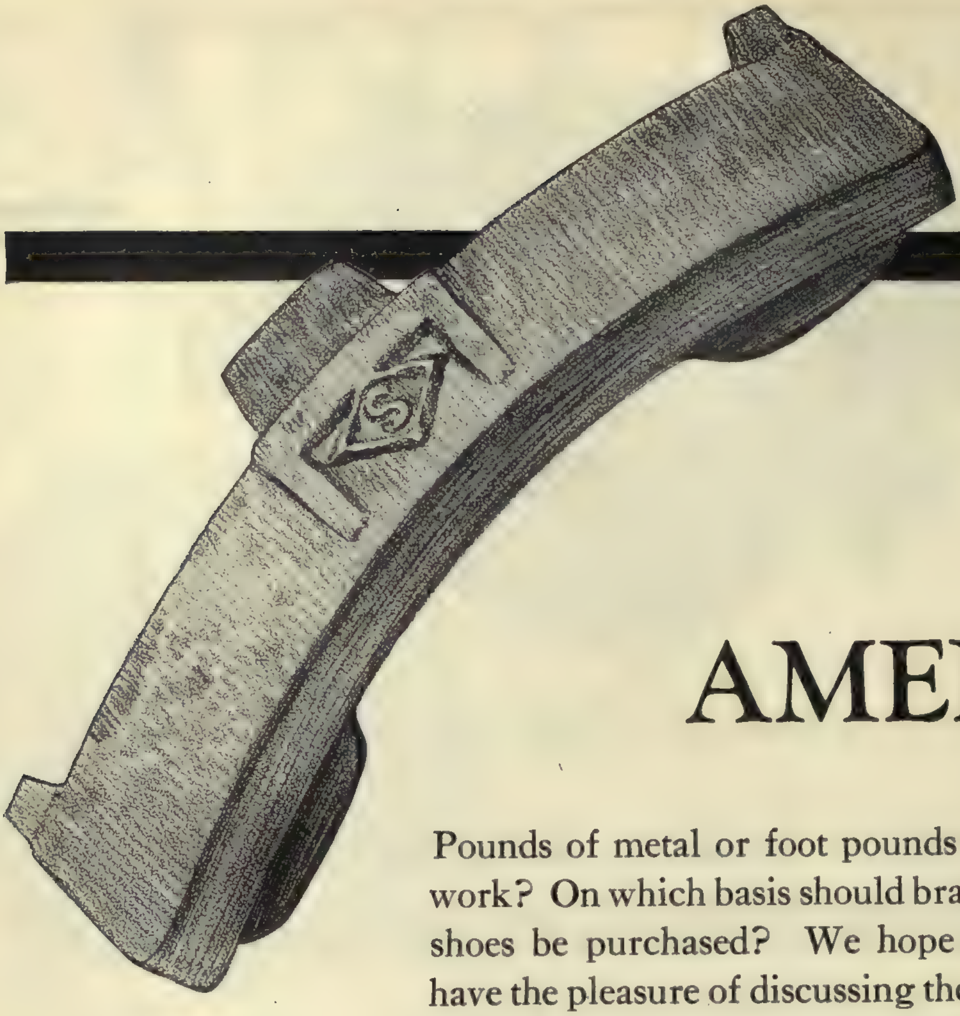
There is nation-wide *service proof* of the superior merits of Chillingworth Gear Cases. Ask users about them.

Chillingworth Manufacturing Co.

Jersey City, N. J.

Representatives:

J. W. Gerke	H. F. Keegan	Railway & Power Eng. Co.	Tool Steel Gearing & Equip. Co.	E. Lewis Sales Co.	G. W. Wagner
New York	Chicago	Canada	England	Des Moines, Ia.	Detroit, Mich.



AMERICAN

Pounds of metal or foot pounds of work? On which basis should brake shoes be purchased? We hope to have the pleasure of discussing these and other brake shoe questions with you when you visit—

SPACES 274-275-287-288

"Best by Test"

**THE AMERICAN BRAKE SHOE
AND FOUNDRY COMPANY**
30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO

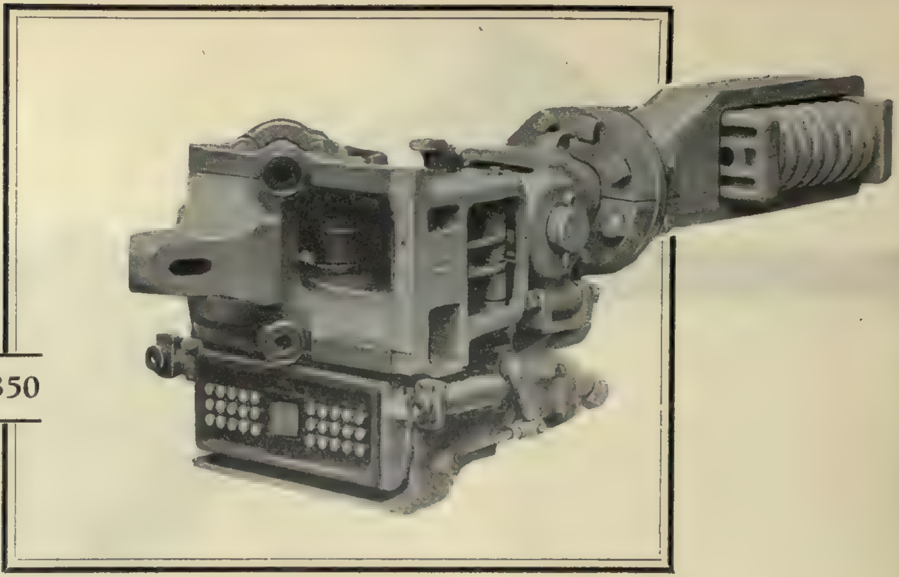
BRAKE SHOES

Our representatives at Cleveland will not only be glad to discuss your brake shoe problems but will appreciate the opportunity to show you the latest brake shoe developments. We cordially invite you to visit our booth—

AT CLEVELAND

"Best by Test"

THE AMERICAN BRAKE SHOE
AND FOUNDRY COMPANY
30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO



No. 2350

Van Dorn Couplers

Practical Time and Labor Savers

Number 2350 is a Radial Car Air and Electric Coupler for heavy electrical train service. It is designed to operate cars on sharp curves and over abrupt changes in grades.

The coupling is completed on the impact of the cars, and uncoupling is accomplished by the operator from the inside or side of car.

In uncoupling, the air valves are closed and the circuits are opened so that there is no current in the electric couplers at either end of the train.

The electric coupler contacts are sealed against weather by a rubber gasket when coupled, and in the uncoupled position, are covered by a door. Photo shows coupler in uncoupled position with door of electric coupler open showing control contacts on each side and bus contacts in center of electric coupler.

The Number 930 radial M.C.B. Coupler is an unexcelled equipment for heavy interurban freight or passenger service.

The Coupler is of standard A.R.A. specification (Contour No. 10), which permits a sufficient amount of clearance so that it will not bind in handling a train of cars over abrupt changes in grade.

The Coupler has a lock-set position, making possible one man switching.

It will intercouple with any other standard M.C.B. Type.

No. 930

VAN DORN COUPLER CO.

2325 So. Paulina Street, Chicago, Ill.

Canadian Representatives: Railway & Power Engineering Corp., Ltd., Toronto, Ontario

TRADE ROL-MAN MARK

Rol-Man Truck and Car Parts *for* Electric Railways

ROL-MAN Manganese Steel Truck and Car Parts are now in service on a number of the country's foremost electric railway properties. In each case, they have definitely proved that their selection was more than justified from every standpoint.

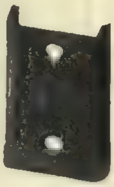
Made of Rolled or Forged Manganese Steel, which possesses the *highest abrasive resistance* of any steel made, ROL-MAN Truck and Car Parts cut wear to a minimum, greatly diminish "pull-ins," reduce noise and bring about a freedom from vibration hitherto unknown.

ROL-MAN Manganese Steel Truck and Car Parts are *long-lived.* Their life is measured by years, whereas ordinary parts mean pull-ins every few months for repairs or renewals.

Made in all shapes and styles to meet every requirement. Pressed, flanged, bent, punched, countersunk and fabricated or forged. Only a few of the many shapes and sizes are illustrated here.

Below is a partial list of ROL-MAN Manganese Steel Truck and Car Parts:

- **Journal Box and Pedestal Jaw Gibs or Liners**
- **Bolster and Transom Chafing Plates**
- **Bolster Hanger Wear Plates**
- **Side-Frame Wear Plates**
- **Bolster End Wear Plates**
- **Brake Rod Chafing Plates**
- **Truck and Body Bolster Center Plates**
- **Brake Beam Wear Plates and End Supports**
- **Buffer Wearing Plates — Sector Bar Liners**
- **Draw Bar Parts for Car Bodies**
- **Forged Swing Hanger Axles and Supports**



You are invited to visit our exhibit in Booth 124 at the A. E. R. A. Convention, Cleveland, October 4th to 8th. Samples of ROL-MAN Manganese Steel Truck and Car Parts in service on various electric railway properties will be exhibited for your inspection.

MANGANESE STEEL FORGE CO.

Main Office and Works:

Richmond St. and Erie Ave., Philadelphia, Pa.

Manufacturers of ROL-MAN ROLLED and FORGED
MANGANESE STEEL PRODUCTS

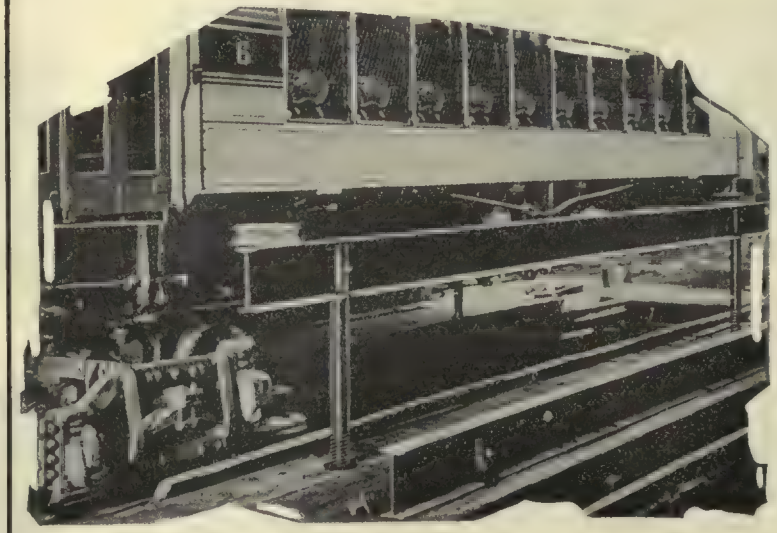
PITTSBURGH OFFICE
Oliver Bldg.

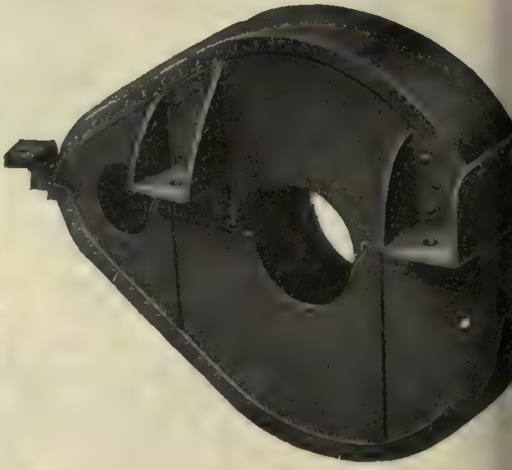
NEW YORK OFFICE
30 Church St.

LOS ANGELES OFFICE
320 S. San Pedro St.

DETROIT OFFICE
Lexington Bldg.

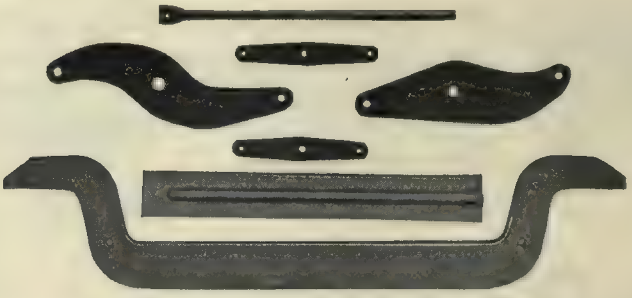
COLUMBIA





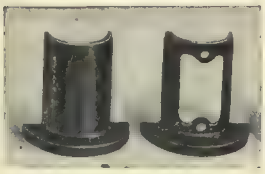
SOME COLUMBIA PRODUCTS

- Door and Step Mechanisms
- Air Brake Handles
  - (brass and malleable iron)
- Controller Handles
  - (All types operating and reversing)
- Signal Bells
- Door Trucks and Sheaves
- Platform Gongs
- Controller Parts and Handles
- Trolley Wheels, Poles and Harps
- Destination Signs (Steel)
- "Nevasplit" Headlining
- Grid Resistors
- Armatures and Armature Parts
- Commutators (all types)
- Field Coils
- Brush-holders and Brush-holder Springs
- Truck Parts
- Brake Rigging, Forgings, etc.
- Bearings (Axle and Armature)
- Castings in Aluminum: Brass; Bronze; Cast Steel; Grey Iron; Malleable Iron; White Metal and Zinc
- Brake, Door and other Handles
- Car Trimmings
- Forgings of all kinds
- Gear Cases (steel or malleable iron)
- Third-rail Shoe Beams and Accessories
- Babbitting Molds
- Banding and Heading Machines
- Car Hoists and Replacers
- Coil Taping Machines for Armature Leads
- Coil Winding Machines
- Pinion Pullers
- Pit Jacks
- Signal or Target Switches
- Tension Stands



COLUMBIA 1892 MACHINE WORKS

SERVICE



A threefold tie-in with the modern trend in operation

New cars! new policies! new service! Thus has the electric railway industry answered the challenge of growing competition. And despite many a handicap the fight is surely going to the defender.

Yet, the vital routine of maintenance and the necessity for ***economy*** in maintenance, must never be lost sight of, if the newly raised standards are to be maintained.

Columbia Service stands ready to help towards this end in three specific ways.

Firstly, by providing a dependable source of supply of car, line and motor equipment specialties of known quality and performance ability.

Secondly, by designing and building electric railway maintenance shop units for the quicker and more economical handling of general maintenance work.

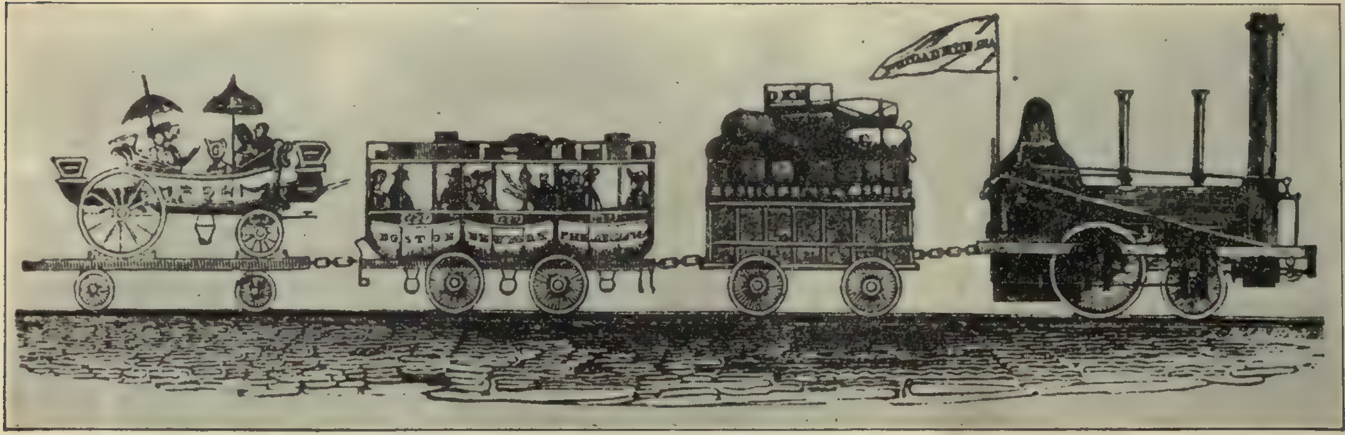
And last but not least, by providing complete modern engineering and shop facilities for the design and construction of special or standard parts in any quantity and for efficient economical handling of partial or complete rehabilitation of existing equipment.

Columbia Service comprising these essentials is available immediately. We invite you to use the Columbia Organization and facilities as if they were part of your own property. Consult us.

Columbia Machine Works
& Malleable Iron Company
Chestnut Street and Atlantic Ave., Brooklyn, N. Y.

Who Invented the Wheel?

It is generally agreed by students of the history of civilization that that man did more for material progress than any other man could possibly have done. The wheel is the fundamental element in every vehicle of transportation.



An American Cut of 1834. (Note the private carriage on the flat car)

COST LESS PER TON MILE

THEY CARRY A SERVICE GUARANTEE

THE HARD TREAD AND FLANGE HAS A MAXIMUM WEARING VALUE

The Standard Wheel for 74 Years

A.R.A. Standards

650 lb. Wheel	for 30 Ton Cars
700 lb. Wheel	for 40 Ton Cars
750 lb. Wheel	for 50 Ton Cars
850 lb. Wheel	for 70 Ton Cars

ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS
1847 McCormick Building
CHICAGO

50 Plants—Daily Capacities 20,000 Wheels

PS HEATERS

PETER SMITH HEATERS

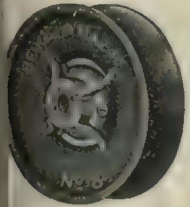
— Warm and ventilate the car
— Do not add to the peak power loads
— Cost from 40% to 60% less than any other form of car heating

Use them and save the difference!

Call on us at Booth 293

THE PETER SMITH HEATER CO.
Detroit, Michigan **Walkerville, Ontario**

Kalamazoo



ılamazoo wheels are
ade of virgin metals
pure lake copper—
ey are of proper
sign for the intended
rvice, and are
pnestly manu-
ctured.

ey are balanced for
y running and free-
m from slippage,
ey do not wear
wn and damage the
re, for wire life is
re important than
eel life.

amazoo Harps give perfect
continuous contact, and are
igned to permit easy replace-
nt of wheels. There is only
cotter pin to be taken out
remove the wheel.

Endorsed by leading Electric Roads

In a field where competition is keen and the emphasis is on greater operating economies—the wide choice of Kalamazoo Trolley Wheels and Harps—an ever-increasing choice during the last 30 years—is surely significant.

We make these products exclusively. We know the demands of modern practice, the importance of proven wheel-wear and contact. And Kalamazoo Wheels and Harps are designed and built to render perfect service.

May we not submit evidence of their performance under conditions that parallel yours?

Star Brass Works
Kalamazoo, Michigan
The largest exclusive manufacturers of trolley wheels in the world.

AJAX BULL BEARING ALLOY

Wears Longer Than Babbitt

The labor cost of rebabbitting a bearing is far greater than the cost of the metal; therefore the life of the bearing, the wearing quality of the metal, is of much greater importance than its first cost. Price per pound is a minor item; it is price per month that should be considered.

The longest wearing metal is the cheapest, regardless of price. Ajax Bull Bearing Alloy is better and cheaper than babbitt because it runs cooler and wears longer. These are claims we are prepared to prove—just give us the chance.

Ask for a copy of the Bull Bearing booklet "Bearing Facts." You'll find it worth while.

THE AJAX METAL CO.
Established 1880
Philadelphia
New York Chicago Boston Cleveland

AXLES

J. R. JOHNSON & CO., Inc.

Axle Specialists Since 1866

Address all mail to P.O. Box 515, Richmond, Va.

FORGED STEEL AXLES
For Electric Railway Motors

Conforming to A. E. R. E. A. Standard Specifications either Annealed or Quenched and Tempered. Furnished Rough Turned All Over or Finished Turned and Burnished.

Armature Shafts and Special Round Forgings of all kinds to Specifications.

Get our quotations.

It will pay you to send us your drawings and ask for our prices.

Eclipse Trolley Catcher-BALL BEARINGS

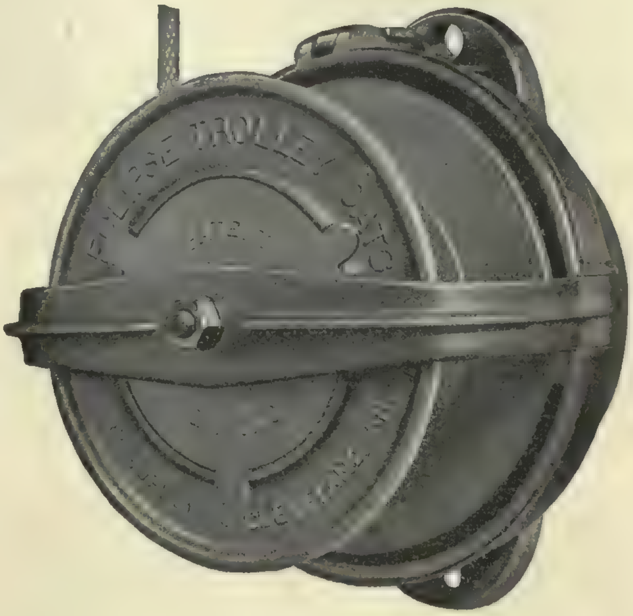
"Can" the Oil Can

The only practical solution of the lubrication problem.

Also Manufacturers of

Eclipse Trolley Retrievers
Standard Lifeguards
Eclipse Fenders
Acme Fenders

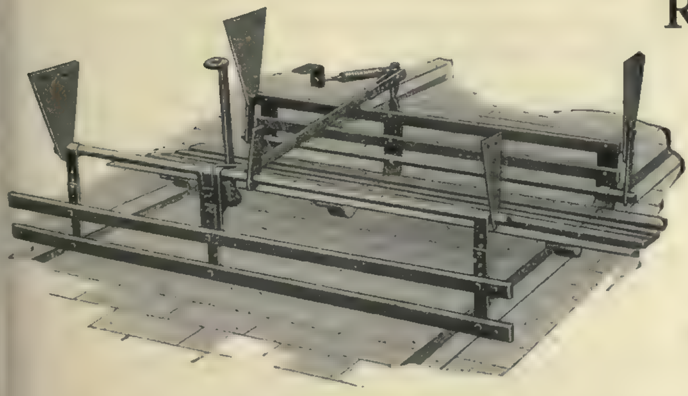
See our display at Booth No. 248
Cleveland Convention



The Eclipse Railway Supply Company
4824 Payne Avenue, Cleveland, Ohio

Snow needn't hamper car operation!

ROOT SCRAPERS



will clear the track

and

Root Spring Life Guards—

make for safer operation

The Root Spring Life Guard is different from any other guard on the market. Made to withstand shocks and to work instantly when needed. It will not rattle down—*it can't.* It is the lightest—the strongest—the simplest—the best working—and has the least upkeep of any life guard.

Investigate them at the Convention.

A.E.R.A. Exhibit—Booth 146

Root Spring Scraper Company
Kalamazoo, Mich.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our* offices count 10 words additional in undisplayed ads.

**Discount* of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches..............$4.50 an inch
4 to 7 inches.............. 4.30 an inch
8 to 14 inches.............. 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

ERJ

POSITIONS WANTED

ACTIVE young man, single, age 22, over three and one half years special training with large builder of street railway cars and trucks, desires change to mechanical department of operating company with opportunities for advancing. Can arrange for an interview with any interested party at Cleveland convention and solicit correspondence of others not attending. PW-927, Electric Railway Journal, 1600 Arch Street, Philadelphia, Pa.

SUPERINTENDENT of transportation: Qualified by a former successful record of twenty years on large city and interstate properties also co-ordination of rail and bus service recognized as an official of exceptional ability, successful in rehabilitation of properties, public relations, accident prevention, one man operation and handling of labor. Fully competent to take over any property and get results. High-grade references, correspondence invited. Will make appointments for interview at Cleveland convention or at convenience of interested parties. PW-926, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

POSITIONS WANTED

SUPERINTENDENT with twenty years' experience in operation and maintenance of railway rolling stock and track; an outstanding success as a railway operator and as operator of co-ordinated railway and bus services desires for personal reason to make change. Fully capable of taking complete charge as manager or superintendent. PW-925, Electric Railway Journal, 7 South Dearborn St., Chicago, Ill.

OPERATING executive, now employed desires change, twenty-five years' practical electric railway transportation experience, familiar with making schedules, public relations, labor and traffic problems, and requirements for successful and efficient operation. PW-935, Electric Railway Journal, 7 So. Dearborn Street, Chicago, Ill.

MASTER mechanic. 20 years' experience in the operation of city, interurban and bus lines. Open for position. Best reference. PW-936, Electric Railway Journal, 1600 Arch St., Philadelphia, Pa.

POSITIONS WANTED

SUPERINTENDENT of transportation: With unquestionable qualifications, wide experience, fine record of achievements on city and interurban properties, credited with having built up one of the best groups of trainmen in the Middle West and placing property on paying basis, at present engaged, wishes to make connection with a property that is in need of a clean cut, progressive, capable transportation official. High-grade references. Correspondence invited. Can arrange for interview at Cleveland convention. PW-934, Electric Railway Journal, Guardian Bldg., Cleveland, O.

TO HELP YOU

LOCATE COMPETENT MEN

"Searchlight" Advertising

G-3

Saving is a good habit, BUT—

Why Save Things You'll Never Use?

WHY let Mother Nature grow grass between the wheels of replaced cars? Why pile up rails, shop equipment, power plant equipment, line equipment, car appliances, road building material, etc., etc., you will never use again?

TODAY you can turn them over at a fair price. Tomorrow they will be—JUNK. Is it not the better part of good horse-sense to dispose of them NOW?

6000 other electric railway men will see your advertisements of used or surplus equipment and materials here—in the Searchlight Section of their business paper.

Some of these men—officials or executives of other lines in other parts of the country and operating under different conditions—can use what you no longer need. For an insignificant investment you can tell these others what you have. And they will buy.

One "Searchlight" advertiser wrote, "We can cheerfully recommend the Searchlight Section as a wonderful medium for reaching buyers of rails and equipment." Another—"The strongest proof that your 'Searchlight' finds its way to many readers is shown by the numerous letters we have received in answer to our recent ad."

Let us tell you the cost of advertising your used or surplus equipment and materials in the Searchlight Section. Just address a list of what you have to dispose of to the

Searchlight Department
ELECTRIC RAILWAY JOURNAL
Tenth Ave. at 36th St., New York, N. Y.

We Buy

Complete Electric Railways for Dismantling

HIGHEST PRICES PAID
SPEEDY REMOVAL

Recent Operations include The New York & Long Island Traction Company

Write Us.

H. E. SALZBERG CO. Inc.
50 Church St., New York

Operations Ceased,

We Bought the Equipment—

and now you can buy at BARGAIN PRICES!

We purchased all the equipment of the New York and Long Island Traction Company for re-sale. All of it is in excellent condition, and presents a buying opportunity that enables you to secure equipment for which there is an every-day need, at prices that mean considerable savings over a new purchase.

Write for complete information on equipment listed here—

Railway Motors
25—Westinghouse 307's G.E. 80's.

Tower Truck
1—2½-3 ton White. Three section. Fully equipped. New 1923.

Car Hoist
1—Universal Columbia Mch. Co. make. Motor and control equipment included.

Welding Machine
1—Railway Welding and Bonding Co. New 1923. Fully equipped.

Birney Cars
4—32 seating capacity Westinghouse 508A motors. Fully equipped. Splendid condition.

Southern Cars
6—Double truck, 42 passenger . One man operation.

Sweeper
1—Double truck Snow Sweeper. Fully equipped.

Rico Oilers
for Westinghouse 307's and G. E. 80's; also other types of motors.

H. E. SALZBERG CO., Inc.
50 Church St., New York

ELECTRIC SHOVEL

1½-yd. Vulcan, standard gage, 600 v., d.c. shovel. In first class condition. Must be moved at once so only $1,700.00 will buy it.

ZELNICKER IN ST. LOUIS
Rails Equipment Steel Piling, etc.

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built
West. 508 or G.E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

Wanted—

60 to 85 ton Electric Locomotive—railway voltage.
2—1000 kw. Railway Rotary Converters, 60 cy., 3 ph. or 6 ph.
24—Lightweight Double Truck Cars.

For Sale

1—Double Truck, Double End Combination Plow and Sweeper—fully equipped.
1—Double Truck, Double End Sweeper, fully equipped.
2—Single Truck, Double End Sweepers.

MOTORS

12—W. H. 306 CV-4.
20—W. H. 306 SV.
8—W. H. 327-C.
20—W. H. 101-B.

We have for immediate delivery 400 motors of various types.

CONTROLLERS

100—K-6.
70—K-28-D.
40—K-35-G-2.
20—Westinghouse H-L Control Sets.

COMPRESSORS

24—CP-27.
30—DH-16.
1—DH-10.
5—CP-21.
20—WH D-1-EG.

IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City

Specialists in street cars or any part of a street car. Illustrated bulletin supplied on request.

---

25 CYCLE, 600 VOLT

G. E. ROTARIES

FOR SALE

These Rotaries now being removed from service because of system change to 60 cycle operation. The machines are all in good operating condition, some of them still running. Available for inspection at any time.

Quantity	*K.W.*	*R.P.M.*	*Winding*
*2	300	500	Shunt
*1	300	500	Compound
2	500	500	Shunt
*2	1000	300	Shunt
1	1000	375	Shunt
2	1000	375	Compound
5	1000	250	Shunt
1	1500	300	Shunt

*13,200 Volt transformers available on these items.

ADDRESS INQUIRIES TO

PUBLIC SERVICE ELECTRIC & GAS COMPANY
80 PARK PLACE, NEWARK, N. J.

FOR ATTENTION OF:

THOMAS SPROULE, *General Superintendent of Distribution.*

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Advertising Agencies
Doyle, Kitchen & McCormick

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Air Circuit Breakers
Roller-Smith Co.

Air Receiver & Aftercoolers
Ingersoll-Rand Co.

Air Springs
Cleveland Pneumatic Tool Co.

Ammeters
Roller-Smith Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Door Equipment
Manganese Steel Forge Co.

Automatic Regulators Volt—age Current, Synchronizing
American Brown Boveri Elec. Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
St. Louis Car Co.
Standard Steel Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Front
Shuler Axle Co.

Axles (Front & Rear) Motor Truck & Passenger Car
Timken-Detroit Axle Co., The

Axles, Rear
Clark Equipment Co.

Axles, Steel
Carnegie Steel Co.
Johnson & Co., J. R.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co., The

Babbit Metal
Ajax Metal Co.
A. Gilbert & Son Brass Fdry. Co.
Johnson & Co., J. R.
More-Jones Brass and Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Baggage Checks
Globe Ticket Co.

Bankers
Henry L. Doherty Electric Railway Securities

Batteries, Dry
National Carbon Co.
Nichols-Lintern Co.

Bearings
A. Gilbert & Son Brass Fdry. Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
More-Jones Brass and Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Ball
Norma Hoffman Bearing Corp.
S. K. F. Industries

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co. A.

Bearings, Roller
Norma Hoffman Bearing Corp.
S. K. F. Industries
Timken Roller Bearing Co.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Anheuser-Busch Co.
Auto Body Co., The
Baker-Raulang Co., The
Bender Body Co.
Cummings Car Coach Co.
Farnham-Nelson Co.
Hoover Body Co.

Bodies, Passenger Car
Baker-Raulang Co., The

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts, Nuts, Rivets
Russell, Burdsall & Ward Bolt Nut Co.

Bolts-Nuts Track
Illinois Steel Co.

Bolster Hanger Wire Plates
Manganese Steel Forge Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.
Roller-Smith Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brackets, Hand Rail
Eberhard Mfg. Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Blocks (Bus)
American Brake Material Corp.

Brake Shoes
American Brake Shoe & Foundry Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.
National Carbon Co.
Stackpole Carbon Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co., Inc.
National Carbon Co.
U. S. Graphite Co.

Brushes, Metal Graphite
National Carbon Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Brushholders
Columbia Machine Works

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co.
Heywood-Wakefield Co.

Bus Wheels, Steel
Steel Works, Inc.
Heywood-Wakefield Co.

Buses, Gasoline
Liberty Motor Vehicles Co.

Buses, Motor
American Car and Foundries Motor Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Fageol Motors Corp.
Graham Bros.
International Harvester Co.
International Motor Co.
Mack Trucks
Reo Motor Co.
St Louis Car Co.
Six Wheel Co.
Studebaker Corp. of America

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Carbon Paste, Welding
National Carbon Co.

Carbon Plates, Welding
National Carbon Co.

Carbon Rods, Welding
National Carbon Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Steps
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The, J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas, Rail
Brill Co., The, J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car and Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The, J. G.
General Electric Co.

Cash Fare Receipts
Globe Ticket Co.

Castings, Brass Composition or Copper
Ajax Metal Co.
A. & J. Anderson Mfg. Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Brake Shoe & Foundry
American Steel Foundries
Bemis Car Truck Co.
St. Louis Car Co.
Standard Steel Works

Castings, Malleable and Brass
American Brake Shoe & Foundry
Bemis Car Truck Co.
St. Louis Car Co.

Castings, Nichrome
Driver-Harris Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Eclipse Railway Supply Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Chafing Plate
Manganese Steel Forge Co.

Chairs, Parlor Car
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co
Electric Service Supplies Co.
Galef, J. L.

Circuit-Breakers
A. & J. M. Anderson Mfg. Co.
General Electric Co.
Roller-Smith Co.
Westinghouse E. & M. Co.

Circuit Breakers (Oil)
American Brown Boveri Elec. Corp.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Dossert & Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Root Spring Scraper Co.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Economy Electric Devices Co.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
Galef, J. L.
International Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Galef, J. L.

Coin Wrappers
Cleveland Fare Box Co.
Galef, J. L.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Sullivan Machinery Co.
Westinghouse Tr. Br. Co.

Compressors, Gas
Sullivan Machinery Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

Compressors, Portable
Sullivan Machinery Co.

Condensers
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co

Conduits, Underground
Standard Underground Cable Co.

Connectors, Solderless
Dossert & Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heat Co.
Elec. Service Supplies Co
Ohio Brass Co

Control Systems
Monitor Controller Co.

Controllers or Parts
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.
Monitor Controller Co.

Controllers, Automatic, Electric
Monitor Controller Co.

Controllers, Electric
Monitor Controller Co.

Controllers, Motor
Monitor Controller Co.

Controllers, Rheostatic
Monitor Controller Co.

Controllers, Speed
Monitor Controller Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Amer. Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Coupon Books
Globe Ticket Co.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.
Van Dorn Coupler Co.
Westinghouse Tr Br Co.

Crane Controllers, Electric
Monitor Controller Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cranes, Electric, Industrial Truck Mounted
Baker-Raulang Co., The

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J G.
Edwards Co., Inc., The O. M.
Morton Mfg. Co.
Pantasote Co., Inc.
St. Louis Car Co.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co
Public Service Electric & Gas Co.
Salzberg, Inc., H. E.
Van Loan, Irving S.
Zelnicker in St. Louis

Dealer Second Hand Rails
Electric Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Dome Lights
Adams & Westlake Co.

Door Control Equipment
Eberhard Mfg. Co.

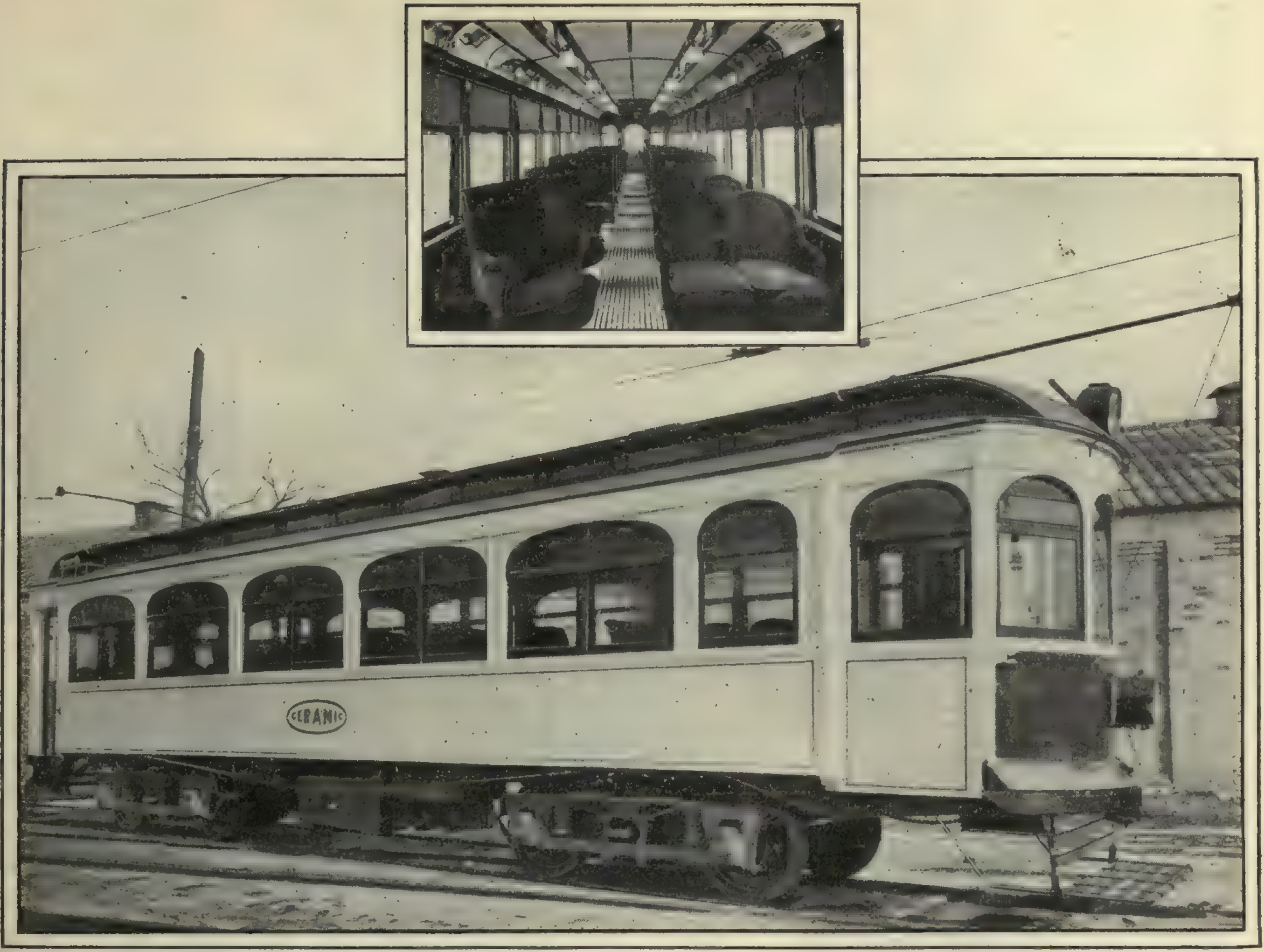
Door Lock
Eberhard Mfg. Co.

Door Operating Devices
Brill Co., The J G
Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Doors & Door Fixtures
Brill Co., The J G
Edwards Co., Inc., The O. M.
General Electric Co.
Hale-Kilburn Co.
Morton Mfg Co
St. Louis Car Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

(Continued on page 282)



In de luxe service

BETWEEN Steubenville, Ohio, and Beaver, Pa., runs the Ceramic Flyer, a car de luxe in upholstery, painting, and in the schedule it maintains. To protect the reliability of operation of this car, on which passengers have come to rely, National Pyramid Brushes, Grade 402, are used exclusively in driving motor and compressor motor.

In displaying such confidence in these brushes, the Steubenville, East Liverpool & Beaver Valley Traction Co. pays a deserved tribute to quality and service. This company carries about twelve million passengers a year in city and interurban runs, and operates 56 cars. Its reliance on National Pyramid Brushes is of significance to traction companies large and small.

NCC Grade 402 is one of the most popular of our brushes. We also make a number of other grades and types to suit special conditions. Our Sales Engineers will be glad to study these thoroughly before making brush recommendations that will give increased reliability of service.

National
Pyramid Brushes

Manufactured and guaranteed by
NATIONAL CARBON COMPANY, INC.
Carbon Sales Division
Cleveland, Ohio San Francisco, Cal.
Canadian National Carbon Co., Limited, Toronto, Ontario

Emergency Service Plants

CHICAGO, ILL.
551 West Monroe St.
Phone: State 6092

PITTSBURGH, PA.
7th Floor, Arrott Power Bldg. No. 3, Barker Place
Phone: Atlantic 3570

NEW YORK, N. Y.
357 West 36th St.
Phone: Lackawanna 8153

BIRMINGHAM, ALA.
1824 Ninth Ave., N.
Phone: Main 4016

Drills, Track
Amer. Steel & Wire Co
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Locomotives
St. Louis Car Co.

Electric Refrigerators, Car
Phoenix Ice Machine Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Beeler, John A.
Bibbins, J. Rowland
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly, Cooke & Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engineers, Inspecting, & Chemists
Pittsburg Testing Laboratory

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Engines, Gasoline
Continental Motors Corp.
Waukesha Motor Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Economy Electric Devices Co.
Cleveland Fare Box Co.
Galef, J. L.
Johnson Fare Box Co.
Nat'l Ry. Appliance Co.
Ohmer Fare Register Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Eclipse Railway Supply Co.
Root Spring & Scraper Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Finishing Materials
Egyptian Lacquer Mfg. Co.

Flashlights
National Carbon Co.

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Flooring, Bus
Tuco Products

Flooring, Car
Tuco Products

Flooring Fireproof
Irving Iron Works

Flooring, Non-Slipping
Irving Iron Works

Flooring, Open Steel
Irving Iron Works

Flooring, Steel, Subway
Irving Iron Works

Flooring, Ventilating
Irving Iron Works

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co.

Furnaces, Electric, Steel Melting
American Brown Boveri Elec. Corp.

Fuses and Fuse Boxes
Consolidated Car Heating Co
General Electric Co.
Westinghouse E. & M. Co

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co

Gas-Electric Cars
General Electric Co.
Westinghouse E. & M. Co

Gasoline Torches
Economy Electric Devices Co.

Gas Producers
Westinghouse E. & M. Co

Gates, Car
Brill Co., The J G.
Cincinnati Car Co.
St. Louis Car Co.

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
Brill Co., The, J. G.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Electric Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
American Brown Boveri Elec. Corp.
General Electric Co.
Leece Neville Co.
Westinghouse E. & M. Co

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Grating, Steel Subway
Irving Iron Works

Greases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co
Ohio Brass Co

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Elec. Service Supplies Co
General Electric Co
Ohio Brass Co
St. Louis Car Co.

Headlining
Columbia Machine Works
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heating Co
Economy Electric Devices Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co

Hinges
Eberhard Mfg. Co.

Hoists, Portable
Ingersoll-Rand Co.
Sullivan Machinery Co.

Hoists and Lifts
Ford Chain Block Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Industrial Tractors
International Harvester Co.

Ignition Units
Leece Neville Co.

Inspecting Engineers & Chemists
Pittsburg Testing Laboratory

Instruments, Measuring, Testing and Recording
Amer. Steel & Wire Co.
Economy Electric Devices Co.
General Electric Co.
Roller-Smith Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
Anchor Webbing Co.
General Electric Co.
Irvington Varnish & Ins Co.
Mica Insulator Co.
Okonite-Callender Cable Co.
Standard Underground Cable Co.
Westinghouse E. & M. Co

Insulating, Silk
Irvington Varnish & Ins Co.

Insulating Varnishes
Irvington Varnish and Insulator Co.

Insulation (See also Paints)
Dolph Co., John C.
Dutchess Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars)

Irons, Body
Eberhard Mfg. Co.

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Elec. Service Supplies Co
National Ry. Appliance Co.

Joints, Rail (See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
S. K. F. Industries
St. Louis Car Co.

Journal Box & Pedestal Jaw Gibs or Liners
Manganese Steel Forge Co.

Journal Box Liners
Manganese Steel Forge Co.

Junction Boxes
Standard Underground Cable Co.

Lacquer Finishes
Egyptian Lacquer Mfg. Co.

Lanterns, Classification
Nichols-Lintern Co.

Lamp Guards & Fixtures
Electric Service Supplies Co.
General Electric Co
Westinghouse E. & M Co

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co
Westinghouse E. & M Co

Lamps, Signal and Marker
Electric Service Supplies Co
Nichols-Lintern Co.
Ohio Brass Co.

Leather
Cleveland Tanning Co.

Letter Boards
Haskelite Mfg. Corp

Lighting Fixtures
Adams & Westlake Co.

Lightning Protection
Elec. Service Sup. Co
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Dossert & Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm Wharton, Jr. & Co.,

Locomotives, Diesel Electric
American Brown Boveri Elec. Corp.

Locomotives, Electric
American Brown Boveri Elec. Corp.
Cummings Car & Coach Co
General Electric Co.
Westinghouse E. & M. Co.

Locomotives, Oil Engine Electric Driven
Ingersoll-Rand Co.

Lubricating Engineers
Standard Oil Co. of Indiana
Texas Co., The
Universal Lubricating Co.

Lubricants, Oil and Grease
Standard Oil Co. of Indiana
Texas Co., The
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.
Manganese Steel Forge Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr & Co.,

Manganese Steel Switches, Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr & Co.

Meters (See Instruments)

Mica
Mica Insulator Co.

Mileage Books
Globe Ticket Co.

Motor and Generator Sets
American Brown Boveri Elec. Corp.
General Electric Co

Motor Buses (See Buses, Motor)

Motor Leads
Dossert & Co.

Motor Trucks
International Harvester Co

Motor Controllers, Electric
Monitor Controller Co.

Motor Starters
Monitor Controller Co.

Motors, Electric
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M Co

Motorman's Seats
Brill Co., The J G
Electric Service Supplies Co
Heywood-Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N

Nitro Cellulose Finishes
Valentine & Co.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Hubbard & Co.

Ohmmeters
Roller-Smith Co.

Oil Purifiers
De Laval Separator Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

Oxygen
International Oxygen Co.

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Dixon Crucible Co., Joseph
Dolph Co., John C.
Dutchess Co
Electric Service Supplies Co
Irvington Varnish & Ins. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co
Valentine & Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pavement Breakers
Ingersoll-Rand Co.
Sullivan Machinery Co.

Paving Materials
American Brake Shoe & Foundry Co.

Pedestal Liner
Manganese Steel Forge Co.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins & Bushings for Brake Equip.
Manganese Steel Forge Co.

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.
Nat'l Ry. Appliance Co.

Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Clamps
Clark-Williams Eng. Co.

Pole Line Hardware
Bethlehem Steel Co.
Electric Service Supplies Co.
Ohio Brass Co.

Pole Mounting
Clark-Williams Eng. Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles and Ties Treated
American Creosoting Co.
Bell Lumber Co.
International Creosoting Co.

Poles, Ties, Posts, Piling & Lumber
American Creosoting Co.
Bell Lumber Co.
International Creosoting Co.
Naugle Pole & Tie Co.

Poles, Trolley
Bell Lumber Co.
Electric Service Supplies Co
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co
Electric Service Supplies Co.

Portable Grinders
Buda Co.

Potheads
Okonite Co
Okonite-Callender Cable Co., Inc.

Power Saving Devices
Economy Electric Devices Co.
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Pumps
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)

Pumps, Air Lift
Sullivan Machinery Co.

Pumps, Fuel & Oil
S. F. Bowser Co.

Pumps, Vacuum
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll Rand Co. (A. S. Cameron Steam Pump Wks.)
Sullivan Machinery Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N

Rail Braces & Fastenings
Ramapo Ajax Corp

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
Rail Joint Co., The

Rail Joints—Welded
Lorain Steel Co
Metal & Thermit Corp

Rail Welding
Metal & Thermit Corp
Railway Trackwork Co
Una Welding & Bonding Co.

(Continued on page 284)

Above Photo, Courtesy Denver Tourist Bureau.

Arapahoe Street, Denver, Colorado.

A Mile-High Service Record

IN APRIL, 1908, in Denver, Colorado, the "Mile-High City," Carnegie Steel Cross Ties were installed on Arapahoe Street. The ties were laid on a rock ballast and then concreted up to the top of the tie. Until 1921 the heavy cars of the Denver Interurban, weighing 62 tons each, were operated on this line.

In May of this year, the track was paved over, as the need for bringing the interurban cars into the center of town had been eliminated. The unretouched photograph above shows one of the Carnegie Ties just as it was dug from the concrete—after eighteen years of service.

The chief engineer of the Denver Tramway Corporation stated that the ties were in an excellent state of preservation and that both clips and ties could have been used for rail renewal.

Service records like this prove the wisdom and economy of laying track on a permanent foundation.

On exhibition in our booth No. 238 at the A.E.R.A.

CARNEGIE STEEL COMPANY

General Offices - Carnegie Building - 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA

1824

Rails, Steel
Carnegie Steel Co.
Illinois Steel Co.

Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Relaying
L. B. Foster Co.

Rails, Steel
L. B. Foster Co.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co. The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
St. Louis Car Co.

Rattan Car Seat Webbing
Heywood-Wakefield Co.

Rectifiers, Mercury Arc Power
American Brown Boveri Elec. Corp.

Refrigerator Cars, Electric
Phoenix Ice Machine Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Electric Service Supplies Co.
International Register Co.
Ohmer Fare Register Co.
Rooke Automatic Register Co.
St. Louis Car Co.

Regulators, Motor Speed
Monitor Regulator Co.

Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.

Replacers, Car
Electric Service Supplies Co.

Resistances
Consolidated Car Heating Co.

Resistance, Wire and Tube
American Steel & Wire Co.
Driver-Harris Co.
General Electric Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Monitor Controller Co.
Westinghouse E. & M. Co.

Roofing, Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Safety Control Devices
Safety Car Devices Co.

Sanders, Track
Brill Co., The J. G
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J G.
Edwards Co., Inc., The O. M.
St. Louis Car Co.

Sash Metal Car Window
Edwards Co., Inc., The O. M.
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Eberhard Mfg. Co.
Haskelite Mfg. Corp
Heywood-Wakefield Co.
Mass. Mohair Plush Co.
Pantasote Co., Inc.
St. Louis Car Co.

Seat Hardware
Eberhard Mfg. Co.

Seats, Bus
Brill Co. The J. G.
Hale-Kilburn Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co The J. G.
Hale-Kilburn Co
Heywood-Wakefield Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co
Public Service Electric & Gas Co.
Salzberg, Inc., H. E.
Van Loan, Irving S.
Zelnicker in St. Louis

Shades, Vestibule
Brill Co., The J. G.

Shock Absorbers
Cleveland Pneumatic Tool Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings, Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Supplies Co.
Nat'l Pneumatic Co., Inc.

Signal Indicating
Nichols-Lintern Co.

Signal Systems, Block
Electric Service Supplies Co.
Nachod and United States Electric Signal Co.
Union Switch & Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
A. & J. M. Anderson Mfg. Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Consolidated Car Fender Co.
St. Louis Car Co.

Snow Sweeper Rattan
Cummings Car & Coach Co.
Heywood-Wakefield Co.
Root Spring Scraper Co.

Solder
A. Gilbert & Son Brass Foundry Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.

Spikes
Amer. Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
American Spiral Spring Co.
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring Mfg. Co.
St. Louis Car Co.
Standard Steel Works

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Stair Steps, Safety
Irving Iron Works

Steel and Steel Products
Carnegie Steel Co.
Illinois Steel Co.
Morton Manufacturing Co.

Steel Car Doors
Morton Mfg. Co.

Steel Flooring
Morton Mfg. Co.

Steps
Irving Iron Works

Steps, Folding
Eberhard Mfg. Co.

Steps, Car
Brill Co., The J. G.
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Storage Tanks
S. F. Bowser Co.

Strain Insulators
A. & J. M. Anderson Mfg. Co.
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express)

Structural Steel
American Brown Boveri Elec. Corp.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo-Ajax Corp.

Switches and Switchboards
American Brown Boveri Elec. Corp.
Consolidated Car Heating Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Switches, Magnetic
Monitor Controller Co.

Switches, Remote, Central
Monitor Controller Co.

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Synchroscopes
Roller-Smith Co.

Tampers, Tie
Ingersoll-Rand Co.
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co.

Terminals, Cable
Standard Underground Cable Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

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Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Cases
Globe Ticket Co.

Ticket Dealers
Globe Ticket Co.

Ticket Choppers and Destroyers
Electric Service Supplies Co

Ticket Punches
Globe Ticket Co.

Tickets & Transfers
Globe Ticket Co.

Tie Plates
Illinois Steel Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires
Firestone Tire & Rubber Co.
Fisk Tire Co.
General Tire & Rubber Co.
Goodyear Tire & Rubber Co.
India Tire & Rubber Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tools, Track & Miscellaneous
American Steel & Wire Co.
Electric Service Supplies Co
Hubbard & Co.
Railway Trackwork Co.

Torches, Acetylene (See Cutting Apparatus)

Tower Wagon & Auto Trucks
J. R. MacCardell Co.

Towers and Transmission Structures
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinders
Metal & Thermit Corp.
Railway Trackwork Co.
Ramapo Ajax Corp.

Track, Special Work
Barbour-Stockwell Co.
Buda Co.
Ramapo Ajax Corp.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Tractors, Industrial, Electric
Baker-Raulang Co., The

Transfer Issuing Machines
Ohmer Fare Register Co.

Transformers
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Treads, Safety, Stair, Car Step
Irving Iron Works Co.
Morton Mfg. Co.

Trolley Bases
General Electric Co.
More-Jones Brass & Metal Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co

Trolley Material, Overhead
A. & J. M. Anderson Mfg. Co.
Electric Service Supplies Co
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Shoes
Miller Trolley Shoe Co.

Trolley Wheel Bushings
More-Jones Brass & Metal Co.
Star Brass Works

Trolley Wheels & Harps
Electric Service Supplies Co.
A. Gilbert & Son Brass Foundry Co.
More-Jones Brass & Metal Co.
Star Brass Works

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
Amer. Electrical Works
Amer. Steel & Wire Co.
American Brass Co.
Anaconda Copper Min. Co
Bridgeport Brass Co.
Roebling's Sons Co., J. A

Trolleys and Trolley Systems
Ford Chain Block Co.

Truck & Body Bolster Center Plate
Manganese Steel Forge Co.

Trucks, Car
Brill Co., The J. G.
Bemis Car Truck Co.
Cincinnati Car Co.
Cummings Car & Coach Co.
St. Louis Car Co.

Trucks, Industrial, Electric
Baker-Raulang Co., The

Trucks, Motor
Graham Bros.
International Motor Co.
Mack Trucks, Inc.

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow & Black Flexible Varnish
Irvington Varnish & Ins Co.

Turbines, Steam
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co

Turnstiles
Electric Service Supplies Co
Perey Mfg. Co., Inc.

Turntables
Electric Service Supplies Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Natl. Ry. Appliance Co.
Nichols-Lintern Co.
St. Louis Car Co.
Railway Utility Co.

Vestibule Linings
Haskelite Mfg. Corp.

Voltmeters
Roller-Smith Co.

Weatherproofing
Morton Mfg. Co.

Welded Rail Joints
Electric Railway Improvement Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Electric Railway Improvement Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Electric Railway Improvement Co.
General Electric Co.
Metal & Thermit Corp.
Nat'l Ry. Appliance Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding and Cutting Tools
International Oxygen Co.

Welding Steel
Electric Railway Improvement Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
General Electric Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Asso. of Mfgrs. of Chilled Car Wheels
Bemis Car Truck Co.
Griffin Wheel Co.

Wheels, Car, Steel & Steel Tire
American Steel Foundries
Carnegie Steel Co.
Illinois Steel Co.
Standard Steel Works

Wheels, Steel Disc.
Budd Wheel Co.
Steel Wheels, Inc.

Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.
Clark Equipment Co.
Illinois Steel Co.

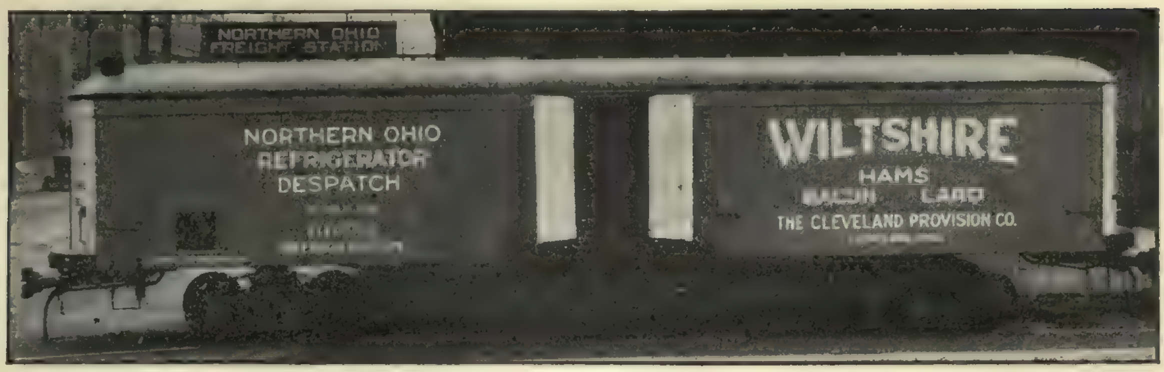
Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co
Westinghouse Traction Brake Co.

Window Sash, Locks and Racks
Morton Mfg. Co.

Wire Rope
American Steel & Wire Co
Roebling's Sons Co., J. A.

Wires and Cables
Aluminum Co. of America
American Brass Co.
American Electrical Works
American Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
General Electric Co.
Kerite Insulated Wire & Cable Co.
Okonite Co.
Okonite-Callender Cable Co., Inc.
Roebling's Sons Co., J. A.
Standard Underground Cable Co.
Westinghouse E. & M. Co.

Wood Preservatives
American Creosoting Co.

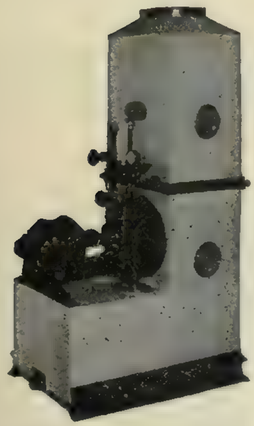

NORTHERN OHIO FREIGHT STATION
NORTHERN OHIO REFRIGERATOR DESPATCH
WILTSHIRE
HAMS
BACON LARD
THE CLEVELAND PROVISION CO.

See the Phoenix Electric Refrigerator Car at the Exhibit in Cleveland

Phoenix Transportation Refrigerating Unit.

Perhaps the greatest step in the modernizing of electric railway equipment in recent years has been the developing of the electric refrigerator car. It enables electric lines profitably to serve their territories in the hauling of perishable products, which for many reasons could not be engaged in previously.

At the Exhibit in connection with the American Electric Railway Association convention in Cleveland, October 4 to 8, will be displayed a Phoenix Electric Refrigerator Car which has been for three seasons, and now is, in active service over the Northern Ohio Traction Lines out of Cleveland.



Lakin Indoor SpraTower
(Patented)

This Phoenix equipped electric car carries an average of one million pounds of perishable products a year for the Cleveland Provision Company. This seems an impossible figure to those thinking in terms of ice refrigerator cars, and it is an indication of the big profit-making possibilities of electric refrigerator cars. Incidentally, this car was converted from a standard freight car in the company's own shops.

Learn the many advantages of Phoenix Electric Refrigerator Cars—their moderate cost, capacity for continuous service, ease of operation, low operating cost and other interesting points.

PHOENIX
ICE MACHINE

THE PHOENIX ICE MACHINE COMPANY, CLEVELAND, OHIO

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The Doorway to Success

NEW light-weight modern cars pay for themselves within a few years. Economies in operation effected by six new cars, weighing 34,000 lb. each, resulted in a 30.1% gross return on investment for the Evansville & Ohio Valley Ry. Co.

Actual Operating Costs

	Old Cars	New Cars
Way and Structures	6.68c.	5.72c.
Equipment	2.05c.	.88c.
Power	5.83c.	5.65c.
Conducting Transportation	10.29c.	7.11c.
General and Miscellaneous	6.45c.	5.38c.
Total	31.30c.	24.74c.
Annual Saving		$24,808.81
Investment		80,000.00
Gross Return		30.1%

THEN the Pennsylvania-Ohio Electric Company with four new 37,000 lb. cars showed a saving equal to 41% gross return on the capital invested. New modern cars also attract passengers and result in increased revenue.

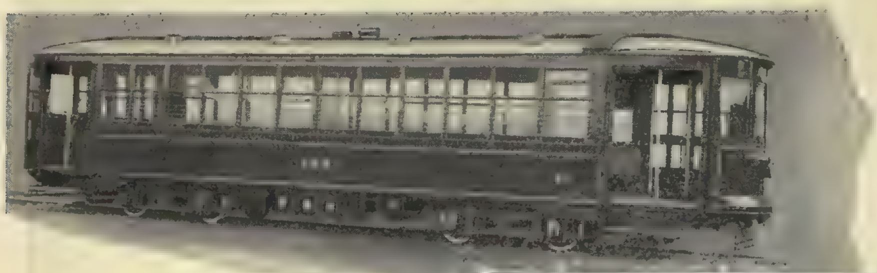
Actual Operating Costs

	Old Cars	New Cars
Way and Structures	7.07c.	7.43c.
Equipment	6.19c.	2.66c.
Power	8.52c.	5.46c.
Conducting Transportation	13.94c.	12.67c.
General and Miscellaneous	11.68c.	11.30c.
Total	47.40c.	39.52c.
Annual Saving		$30,065.00
Investment		72,500.00
Gross return		41%

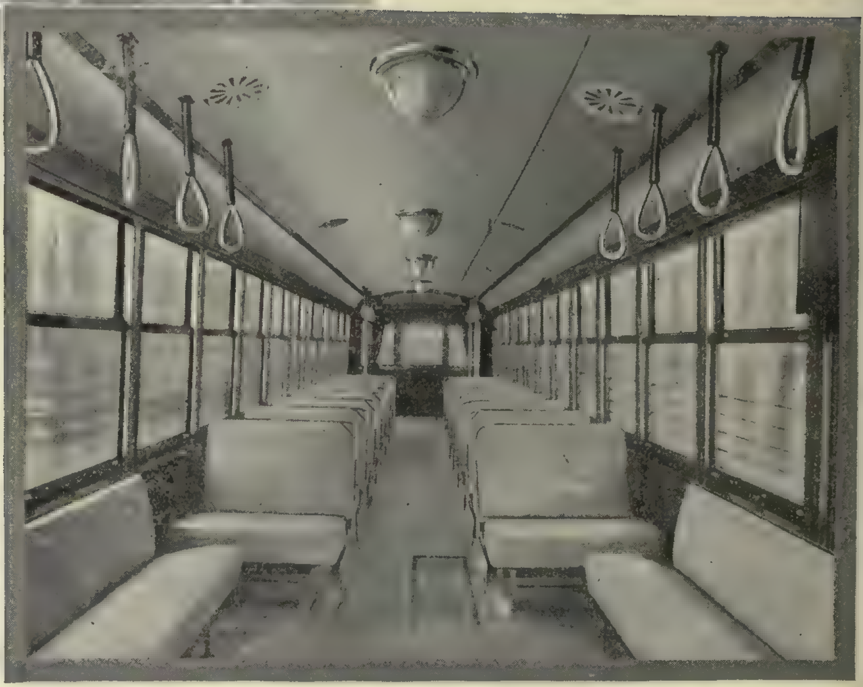
THE J. G. BRILL COMPANY

PHILADELPHIA, PA.

AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.



Modern Cars

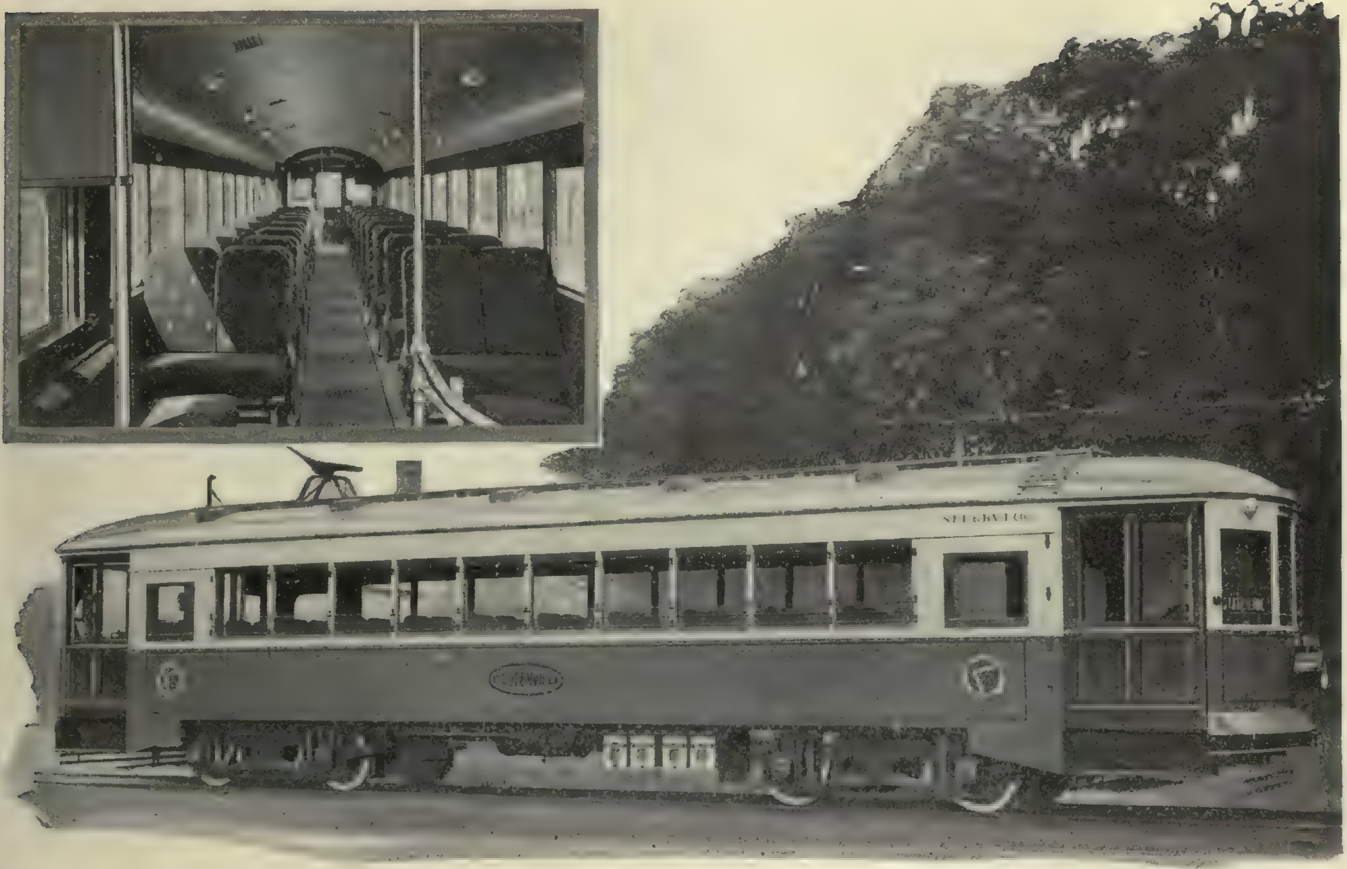


Ten double-end cars mounted on Brill 177-E-1 trucks, recently shipped to Wilkes-Barre Railway Co.

according to the 1926 "standard"

Brill 201-B with deep spring cushions and backs upholstered in genuine gray Spanish grain leather, rubber tile floor covering of slate and gray block pattern, dome lighting and generally attractive interior finish, were included in the ten double-end cars recently shipped to Wilkes-Barre, Pa. This is another illustration of the present tendency toward equipment which conforms to the present day standard of the American people.

The J. G. Brill Company	Philadelphia
American Car Company	St. Louis
The G. C. Kuhlman Car Co.	Cleveland
Wason Manufacturing Company	Springfield, Mass.



Eight new double-end interurban cars, built by Kuhlman for Steubenville, East Liverpool and Beaver Valley Traction Co.

Modern Cars

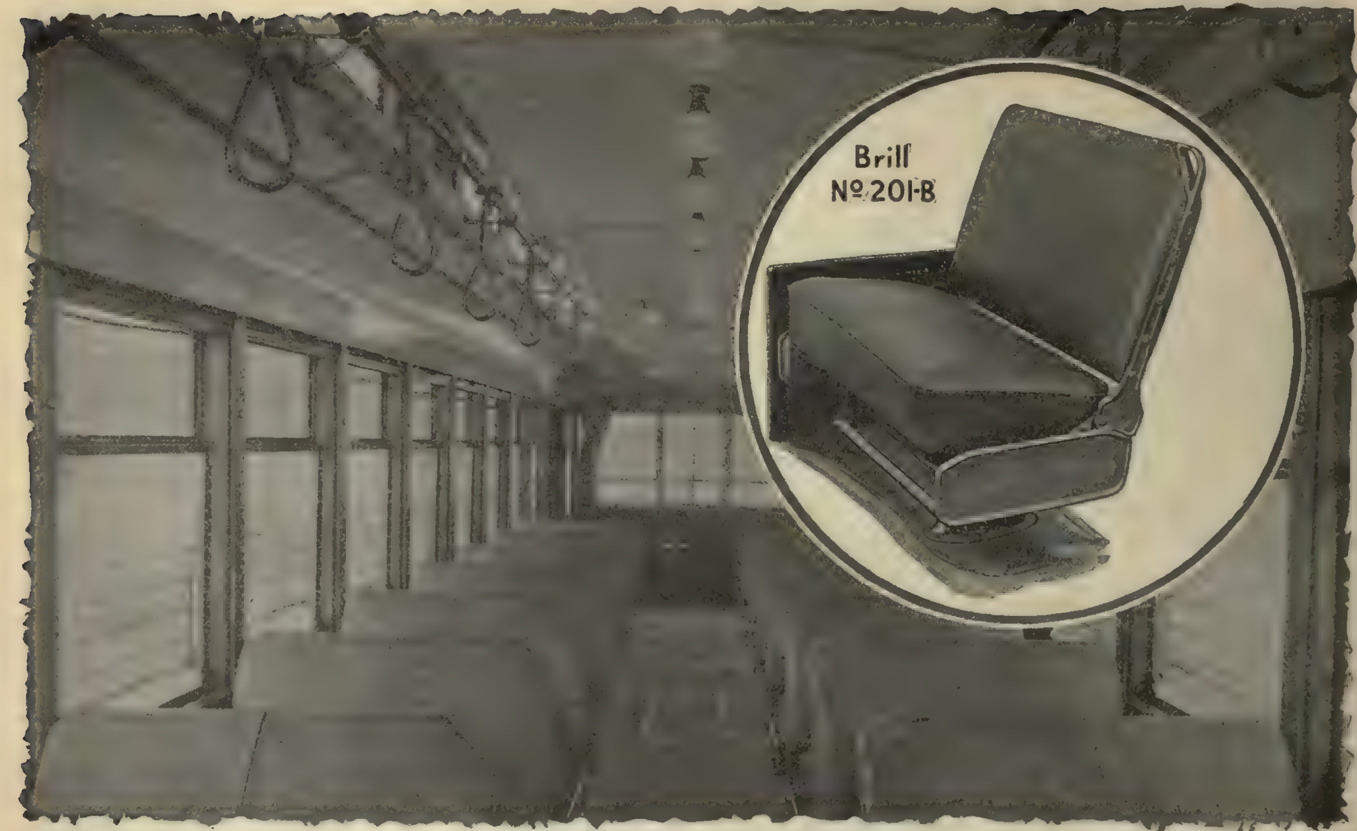
attractively designed— equipped for comfort

Through the courtesy of the railway company delegates to the A.E.R.A. Convention in Cleveland will have an opportunity to see one of the Steubenville, East Liverpool and Beaver Valley Traction Company's new cars.

These cars, which are of a particularly attractive design and equipped with every consideration given to passenger comfort, are 47 ft. long, seat 51 passengers, and are mounted on Brill 77-E type trucks equipped with Twin Swink Links for high-speed service.

This car will be one of the features of
the Brill Track Exhibit
we will also welcome delegates to
Spaces 120, 307-308

BRILL



The fifteen new cars recently furnished the Washington Ry. & Elec. Co. were equipped with Brill No. 201-B Seats.

Seat Comfort will attract passengers to

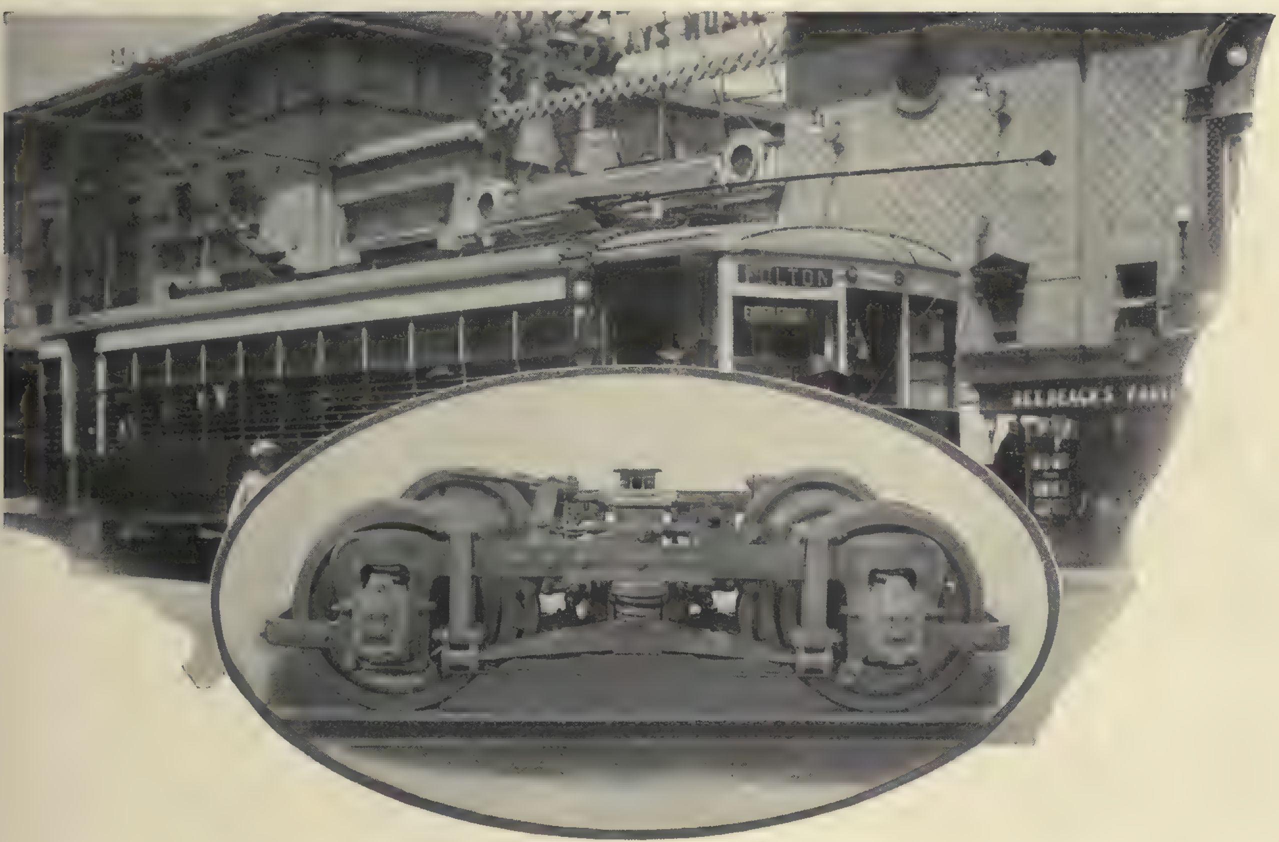
Modern Cars

An improved type reversing mechanism, which permits a slope of the cushion and pitch to the back affording unusual comfort was specially designed for this Brill No. 201-B type seat for double-end modern cars. Deep spring genuine leather upholstered cushion and back add to its attractiveness, a factor in stimulating increased passenger revenue. Sturdily built, like all Brill seats.

Write for Seat Catalog No. 284.

BRILL

We will exhibit a complete line of seats for cars and buses in Space 120, Arena, Cleveland Public Auditorium, A. E. R. A. Convention, Oct. 4 to 8, inclusive.



The fifteen double truck safety cars, built by the American Car Co. for Virginia Elec. & Pwr. Co., were mounted on Brill 177-E-1 trucks equipped with Twin Links.

Modern Cars

require trucks—the result of progressive development

Solid-forged sideframes have been the foundation of the Brill truck system for years. They impart strength and durability to the truck's construction and result in long life and low maintenance. In designing the No. 177-E type for light-weight modern car service a type of solid-forged frame was developed which, while light in weight, lacks none of the strength for which the heavier sideframes are noted.

With this foundation and other important features such as the Graduated Spring System, Bolster Guide, Half-ball Brake Hangers, and Twin Links, this type truck represents years of progressive development, and provides that smooth and comfortable riding action in keeping with modern electric car requirements.

Brill No. 177-E Type Truck for modern light weight cars will be exhibited in the Track Exhibit, A. E. R. A. Convention.

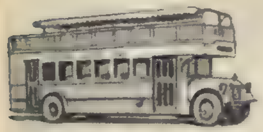
The J. G. Brill Company	Philadelphia
American Car Company	St. Louis
The G. C. Kuhlman Car Co.	Cleveland
Wason Manufacturing Company	Springfield, Mass.

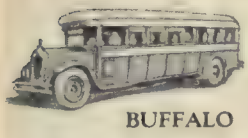
BRILL

Modern Co-Ordinated Transportation *succeeds with* Gas-Electrics

ALBANY

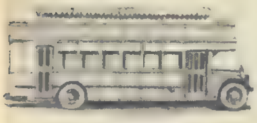
ASHEVILLE


ATLANTA


BUFFALO

DETROIT

KANSAS CITY


LOS ANGELES

ELECTRIC railways have found that the bus has a definite place in their service.

Today, in the scores of communities served by 13 operating companies, G-E equipped Gas-Electric Buses are proving that co-ordinated transportation can best be handled with this type of carrier. Nearly a thousand of these buses are operating daily upwards of 100,000 miles for passenger transportation.

Gas-Electrics make faster schedules and provide a greater comfort—which your public quickly notes and approves. Gas-Electrics are easier and more economical to maintain and have a longer life, which soon registers on your operating costs.

General Electric Gas-Electric Bus Equipment is available for practically any standard type of chassis, in either two-motor or single-motor assemblies.

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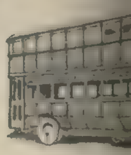
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GENERAL ELECTRIC

McGraw-Hill Publishing Company, Inc. October 2, 1926 Twenty Cents per Copy

ELECTRIC RAILWAY JOURNAL

UNITED STATES ROYAL CORD Motorcoach

Built for "Lowest Possible Cost per Tire Mile—"

UNITED STATES
ROYAL CORD
Motorcoach

Mark MADE BY THE UNITED STATES RUBBER COMPANY Trade Mark

Special train for Cardinals on the North Shore—Westinghouse equipped.

Throngs at the Mundelein Station outer stockade, June 21.

A Momentous Task Well Done

TIME has not lessened the importance of that day last June, when the Chicago Rapid Transit Company and the Chicago, North Shore and Milwaukee Railroad carried a quarter million Eucharistic pilgrims to Mundelein and return, in addition to regular traffic, and without a single accident. The transportation and care of this vast army stands as an achievement without parallel in public service. In sheer magnitude, it is a feat of transportation that almost defies imagination. President Budd and his loyal and capable co-workers have brought honor, not alone to themselves, but to the entire industry. Their accomplishment demonstrates not only the capacity, but the will of the electric railways as a whole to serve the masses. Nearly a million pilgrims, from every corner of the land, carried back home a message of good-will that must benefit the entire railway industry.

Practically all of the cars of the Chicago Rapid Transit Company and
the Chicago, North Shore and Milwaukee Railroad
are Westinghouse equipped.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

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No. 14

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A Convention On Your Desk

DURING the coming week the greatest convention of local transportation men of all time is being staged at Cleveland. Thousands of delegates from all over this country and from foreign lands will be in attendance. Hundreds of thousands of dollars are being spent by manufacturers to exhibit new apparatus designed to improve performance and reduce operating costs. There will be the largest exhibit of street cars ever made. In short, it is only in superlatives that this convention can be characterized.

With the close of the convention Friday night ELECTRIC RAILWAY JOURNAL goes to press. If you are one of the stay-at-homes who kept the wheels turning, the JOURNAL will bring you a full report of this eventful meeting. If you are fortunate enough to attend, on your return you will find a complete review, reports of meetings you could not attend summarized and interpreted for your convenience.

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Advertising Index—Alphabetical, 35; Classified, 30, 32, 35; Searchlight Section, 29

Can your cars "hold their own"?

City streets have become so crowded that there is constant competition between the various elements of traffic for the right of way.

If street cars are to meet this condition and hold their own in the general traffic movement they must be as mobile as other conveyances that use the streets.

An effective means of increasing car mobility is to provide brakes that will permit short stops, and the consequent longer period of peak speed operation and shorter running time between stops. With ordinary brakes, however, the retarding force which is satisfactory for the empty car is less effective when the car is loaded, so that the stopping distance lengthens, and this usually happens just when other vehicles are also contending for the right of way.

The Westinghouse Variable Load Brake was designed to correct this condition. It automatically adjusts the retarding force as the weight varies, so that the stopping distance is constant throughout the range of car loading. This results in accelerated transportation service just when the greatest possible hauling capacity is needed most.

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.

WESTINGHOUSE
## VARIABLE
LOAD BRAKES

Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—*Ask for Descriptive Catalogue T-2045.*

Ideal Section of Chicago, South Shore and South Bend Railroad

40 Miles of O-B Catenary Materials in South Shore Line Rehabilitation

The new O-B General Catalog No. 20 contains much information on modern catenary construction. It includes data of value to every interurban operating official. Have you your copy?

TO GIVE permanency to its 40 miles of new catenary construction, recently erected as part of an extensive rehabilitation program, and to insure maximum freedom from service interruptions in operating its fast interurban trains, the Chicago, South Shore and South Bend Railroad specified modern O-B Catenary Materials throughout.

The new Catenary Overhead extends from Miller, Ind. to Kensington, Ill. It is of the combined contact and feeder system type and replaces in part an old O-B Catenary System that had been in service for nearly 20 years.

The use of O-B Catenary Materials makes possible a flexible contact wire, free from "hard spots," and combines good current collection with maximum economy of maintenance. If you are interested in the advantages of catenary overhead, O-B is at your service.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
184 B

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Safeguard and Accelerate Traffic

Automatic Signals by providing proper spacing of cars or trains, reduce trip time and enable more cars to be operated with consequent safety.

Interlocking installations at terminals and at grade crossings eliminate unnecessary stops and assure route continuity by means of signal indications.

Highway crossing protective devices of the flashing light, automatic flagman, or audible type, or combination of same, are a dependable insurance which soon pays off the investment.

Power operated remotely controlled switches are being used economically to accelerate Electric Railway traffic.

These Systems are products of the

TRADE MARK **Union Switch & Signal Co.** TRADE MARK

SWISSVALE, PA.

The Question:

TREATED OR UNTREATED TIES?

The Answer:

NEITHER—STEEL TWIN TIES!

For the following reasons:

1. Low initial cost. Less than untreated wood ties in Ballast.
2. Long Life joints supported by 468 sq.in. bearing plates.
3. Renewable Track.
4. Permanent Foundation.
5. No perishable material in the foundation.
6. Steel Twin Tie Track requires a minimum of maintenance during the life of the rail.
7. New tamping methods insure complete bearing on concrete.
8. No part of foundation deteriorates with age or service.

May we send you literature and cost figures proving the above?

The International Steel Tie Company, Cleveland, Ohio

Steel Twin Tie Track

Renewable Track · · Permanent Foundation

OCTOBER—
an *Important* month
to Lubricating Engineers

—and this is why:—

Each year, at this time, Electric Street Railways have to meet certain operating conditions which have a seasonable phase.

Being in the Oil business, *we'll* stick to *that* end of it.

That is why we impress upon you that now is the time to begin changing your lubricants to meet weather conditions.

There is good reason for this:

All oils tend to become a little thicker, a little sluggish, in colder weather.

The viscosity (fluidity or body) of all oils varies with temperature. In the application of lubricants to street cars it is the operating temperature that counts. As the weather gets colder, the oils you used all summer will thicken. They will not feed as freely. You can't change the temperature, but you can *change the oils* to compensate.

But weather doesn't change at a given date, so here's what we recommend:

Compensate gradually. Begin now (about the middle of October) adding steadily small quantities of lighter oils to the lubricants now on the cars. This will gradually lower the viscosity, keeping it normal all the time as winter comes.

Begin now, changing over to

TEXACO *WINTER* ELECTRIC CAR OIL
TEXACO *WINTER* AIR COMPRESSOR OIL
TEXACO *WINTER* GEAR LUBRICANT

Then all the time, even in the middle of winter, you will be fully protected by these carefully refined lubricants.*

We have worked out an interesting and economical technique on roads all over the country and shall consider it a privilege to have our TEXACO Lubrication Engineers discuss it with you in person.

As our stations are already stocked with the Winter Lubricants, we are amply prepared to handle your order for them now.

And remember, there is a TEXACO Lubricant for every purpose; for rolling stock or power plant—everywhere along the line.

* In spring, reverse the Process, gradually raising the initial viscosity of the lubricants so that, under the heat of summer, the oils will "fall back" to their original fluidity.

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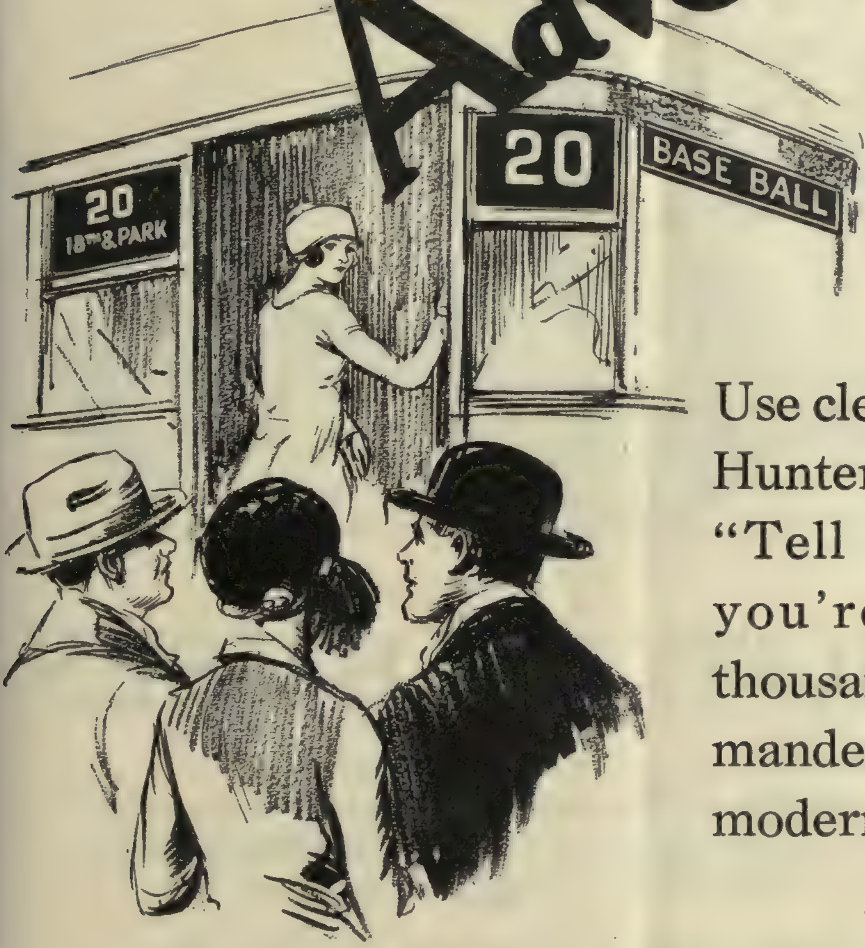
THE TEXAS COMPANY
DEPT. R-J. 17 BATTERY PLACE, NEW YORK CITY
HOUSTON - CHICAGO - NEW YORK
OFFICES IN PRINCIPAL CITIES

TEXACO T REG. U.S. PAT. OFF.

Advertise—those new cars!



Use clear, clean, readable Hunter-Keystone Signs to "Tell the public where you're going" on the thousands of new cars demanded by the industry's modernization program.

Ask for details

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.,

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Bldg.

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

HUNTER-KEYSTONE SIGNS

CLARK AXLES *for*

B-720
Wide Tread
Clark Bus Axle
25-Passenger.

MOTOR BUSES

High speed with greatest efficiency is possible for heavy duty buses built with Clark spiral bevel drive axles—***single reduction.***

Buses up to 25-passenger capacity may be handled with safety when built with Clark wide tread axles.

These axles possess the following essential and distinctive features: straddle mounted pinions with load carried between two annular ball bearings; dual wheel bearings, adding security and service; double compensating internal brakes providing maximum safety with ease of replacement; cast steel, high carbon, air-cooled brake drums; electric steel main axle housing—specially heat treated.

Exhibiting at
American Electric Railway
Association,
Cleveland, Ohio,
October 4-8, 1926.
Space No. 429.

CLARK EQUIPMENT COMPANY
BUCHANAN, MICH.

Member Motor Truck Industries, Inc.

NP

The FIRST

—and practically the only contact with your patrons

— is the DOOR through which they pass

A NICE piece of mechanism is required to control these doors in such a way that they will build your patrons good will rather than occasion their continual annoyance. The National Pneumatic Company has specialized in the building and perfection of such apparatus ever since adoption of the first closed-platform cars.

NATIONAL PNEUMATIC COMPANY

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

Everything a 6 should have *plus* Mack reputation --

Mack Trucks Inc. International Motor Company
25 Broadway New York City

McGraw-Hill Building, New York

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McGraw-Hill has its fingers on the throbbing pulse of American Industry. Its investigators and statisticians are continually garnering facts and figures that help to make McGraw-Hill Publications vital forces in industry. In a never-ceasing stream these comprehensive data pour into the McGraw-Hill organization. Then through the McGraw-Hill Publications the information is disseminated among the particular industries to which it may apply—authoritative, virile facts on the trends and developments of industry.

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Engineering and Mining Journal is the publication through which come facts and figures of vital importance to the stabilization and stimulation of the metallic and non-metallic mining industry. Its market quotations are accepted as a basis for computing contracts in the industry. And its practical information on methods and machinery for eliminating waste and increasing efficiency and profits are welcomed by its subscribers.

Electrical World was the first to collect data on the operations and the development programs of the electrical industry, and has continued to present these statistics week after week, charting in detail, thereby, the progress of this great servant industry. It also publishes each month a national and sectional barometer of activity in each of the primary manufacturing industries. This barometer is based upon reports of electrical energy consumption received monthly from almost 2,000 large manufacturing plants which consume approximately eight-billion kw.-hrs. per annum. This barometer is accepted by economists as the most timely, diversified and sensitive indicator of industrial activity available.

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Approximately 15,000 sources are regularly consulted by McGraw-Hill editors, marketing counselors and statisticians in keeping McGraw-Hill data on industry and electrical and radio trade accurate and up to date.

In addition 220,000 McGraw-Hill subscribers constitute a source that is consulted from time to time for specific data relating to production and buying

41 McGraw-Hill men devote their time exclusively to collating and interpreting data for editorial presentation to McGraw-Hill subscribers and for the information of industrial advertisers.

More than 200,000 vital questionnaires are dispatched yearly from McGraw-Hill offices, many of them going to the same sources week after week and month after month in order that McGraw-Hill reports may be up to the minute. These data are published regularly in the McGraw-Hill Publications and are quoted from them regularly in 134 leading newspapers published in industrial centers.

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And so with all other McGraw-Hill Publications. Industry's dependence upon them is the logical outcome of centralizing the collective resources of the McGraw-Hill Publishing Company in obtaining information and disseminating it scientifically. It is from this storehouse of industrial data and the experience in acquiring the facts that has come the ratings of industrial markets and the formula for selling them efficiently. This knowledge is epitomized in the following McGraw-Hill Four Principles of Industrial Marketing:

MARKET DETERMINATION—An analysis of markets or related buying groups to determine the potential of each. With a dependable appraisal of each market, selling effort can be directed according to each market's importance.

BUYING HABITS—A study of the selected market groups to determine which men in each industry are the controlling buying factors and what policies regulate their buying. Definite knowledge eliminates costly waste in sales effort.

CHANNELS OF APPROACH—The authoritative publications through which industries keep in touch with developments are the logical channels through which to approach the buyer. In a balanced program of sales promotion these publications should be used effectively and their use supplemented by a manufacturer's own literature and exhibits.

APPEALS THAT INFLUENCE—Determining the appeals that will present the product to the prospective buyer in terms of his own self-interest or needs.

The application of these Four Principles of Industrial Marketing to your business must result in greater efficiency and lowered selling cost.

A request, either from you or your advertising agent, for a personal consulation entails no obligation.

McGraw-Hill marketing counselors are at your service, ready to show you how you can effectively use Industry's Data Center.

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COAL CATALOG
CENTRAL STATION DIRECTORY
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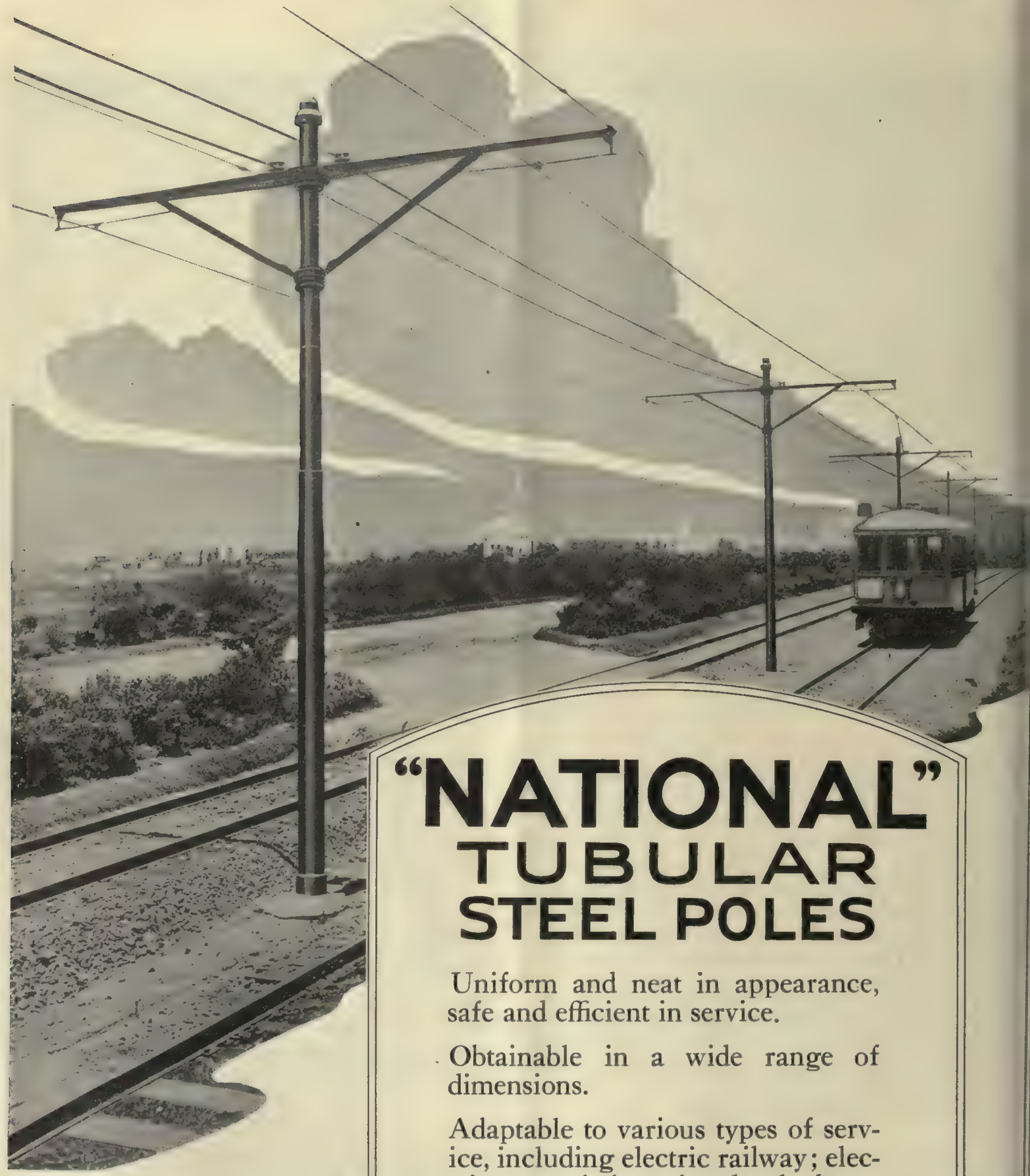
COAL FIELD DIRECTORY
ANALYSIS OF METALLIC AND NON-METALLIC MINING, QUARRYING AND CEMENT INDUSTRIES



"NATIONAL" TUBULAR STEEL POLES

Uniform and neat in appearance, safe and efficient in service.

Obtainable in a wide range of dimensions.

Adaptable to various types of service, including electric railway; electric transmission; signal; telephone, telegraph and street lighting.

Our engineers will be glad to assist in selecting the right pole for any particular installation.

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EXPORT REPRESENTATIVES: U. S. Steel Products Company New York City

Ask for a Copy of Bulletin No. 14 — "NATIONAL" TUBULAR STEEL POLES

BALANCED DESIGN

has made it decidedly EASIER to buy New Cars!!

NEVER before in the history of the industry has car design been so vital a matter, and so complex a subject for consideration, as it is today.

Not only must there be a decisive break with precedent, but the results of this break must be positive—for few railway companies can afford to spend money on experiments.

Hence, it is only natural that many of the properties, which need modernization most, are still holding back, feeling that their own efforts in the design of modern equipment might entail experimental work which they could ill afford.

Is it really necessary, however, for an electric railway to design its own cars? We believe not. And on a basis of this belief we have formulated a new principle of car building—tending, however, to desirable uniformity of *performance* rather than standardization. This is the principle of "BALANCED DESIGN" with both origination of plans and actual construction under one experienced supervision. It provides for a pooling of *all* the best in advanced practice. It has resulted in a series of cars so strikingly different, and so thoroughly practical, as to meet with instant approval.

And these cars in operation on many properties have *without exception* resulted in profitable and healthily growing business.

Certainly it is easier to visualize your new car plans this way. *You make no experiments.* The formula is fixed. The results are certain.

THE CINCINNATI CAR COMPANY
CINCINNATI, OHIO

A step ahead of the modern trend

Your Maintenance-of-Way Department needs G-E Resistor Arc Welders

Some built-in Features of Type AW Resistors

—weigh only 150 lbs.
—are easily portable
—voltage range 400 to 650
—200 or 300 amp. sizes
—65 to 330 amp. current steps
—made of special resistance wire
—well insulated and ventilated
—withstand heavy service and weather conditions

Every loose joint and worn rail in your tracks is losing money for you. Every loose joint represents a current leak and voltage drop—every worn rail a source of damage to equipment.

Keep your tracks in sound condition with G-E Resistor Arc Welders. They are strong, light-weight, compact units, especially designed for welding rail bonds and building up low spots on rails.

Deliveries on these welders are prompt; service is excellent; they cost little to operate and maintain. You can have a complete supply for your maintenance-of-way department at a surprisingly low cost. Complete information at your nearest G-E office.

530-15

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 68 New York, Saturday, October 2, 1926 *Number* 14

Wider Recognition of Need for Parking Regulation

WITH admirable clarity the *American City Magazine,* in its October issue, suggests in a few brief words where we must look for a solution of the parking problem in our congested streets. "The right to move a car is superior to the right to store a car on the public ways." This is the outstanding statement in a set of principles formulated by that paper in behalf of rational city planning and sound municipal finance. A summary of these principles is given elsewhere in this issue.

Gratification will be felt by all transportation men that other influential agencies are thus aiding the fight for relief of congestion by means of parking restriction. Too often it has been left entirely to the local railway management to study the problem of congestion and suggest ways to improve the situation. No matter how fair the proposed solution might be, it usually fell under suspicion because it came from a so-called "interested party." Now, however, other agencies with no axes of their own to grind are coming to see the necessity for better regulation. In the final analysis, every citizen is an interested party, and the relief of congestion will be of benefit to all.

Taxation Relief Holds a Prominent Position Today

STUDENTS of economics have been giving much thought to the general subject of taxation, and have focused particular attention on methods that are applied to the regulated utility. For years innumerable the *ad valorem* principle has been the basic one on which most taxes were levied. Ability to pay has received but scant attention. This is not surprising when it is realized that the *ad valorem* method is not necessarily unjust in case the tax is uniform for all similar industries, and when it readily can be passed on to the ultimate user. Herein lies the difficulty in applying this principle to the electric railways. In this class of industry there are restrictions, known to all operators, that effectively limit the ability to pass on increasing costs by charging higher fares.

Recognizing this feature, tax economists have recently advanced a principle of taxation based partly on the gross revenue and partly on the net revenue. Leslie Vickers, in the article on the gross-net tax in this issue, likens this principle to that of rent. The use of facilities operated under the franchise that the state grants has a value based only on the ability of the industry to earn a profit. If the industry cannot earn a profit then it likewise cannot consistently be expected to pay more than a nominal tax. This principle is so fundamental that it should meet with whole-hearted support on the part of railway officials. One difficulty is that the electric railways may have to fight the battle single-handed, as this form of taxation is of primary value to them. Realizing this, a nation-wide effort to foster measures for taxation relief is being started by the American Electric Railway Association.

There is perhaps no greater or more important opportunity before the industry to-day to gain relief from crushing burdens than through creation of a sound and fundamental tax basis. It is to be hoped that through the effort of the association definite progress can be made during the year, and that at the next convention there will be at least one state which has recognized the gross-net tax in principle and applied it to the utilities under its jurisdiction.

Any utility regulated as to earnings is primarily a tax collector for the state. The tax thus collected should not place the utility in a position of jeopardy, as regards its ability to produce a thoroughly satisfactory service at a living wage.

A Noble Lord Is Taken to Task

ENGLAND, too, has its electric railway detractors no less virulent than those in the United States—detractors who pretend to see the passing of the electric railway. According to the *Electric Railway and Tramway Journal* of London a noble member in the House of Lords recently informed such of his colleagues in that august assembly as were present that "all progressive communities are suppressing the tramways." Of course that paper might be expected to know about any such development, but this startling statement came to it as news, just as similar statements have come to ELECTRIC RAILWAY JOURNAL on occasion. As it is that paper's obvious mission, just as it is that of ELECTRIC RAILWAY JOURNAL, to be keen and avid in its search for railway news, it lost no time in looking into the matter, lest movements of moment should be fructifying while it was under the influence of widely different impressions.

As a result of its search that paper not only failed to find any railway scrappings, but really found in many directions extensions of and additions to the pre-existing tramways. It says that this will doubtless be deemed sheer perversity by the noble lord and those of his fellow peers who take similar views. Still it ventures to draw the inference that the authorities who are thus adding to the mileage of their tramways know what they are doing and why they are doing it, whereas the noble lord and his friends have no actual knowledge of the traffic problem as a whole, of its complexities, or of requirements of the people who are neither peers nor the owners of motor cars. On the other hand, it charges them with considering themselves and their cars only, and with pooh-poohing the serious statements of highly experienced men like Sir Sam Fay, Sir Henry Maybury, and others, who categorically assert that tramways are absolutely necessary and that they cannot be adequately replaced by other means of transportation.

In its protest against the wild and inexact statements which are made so frequently by the enemies of tramways our English contemporary does not suppose for one moment that it will convince them of their errors. In this it is correct. That the paper, as a result of its inquiry, sees no reason to change its opinion will not affect the noble lord any more than would disproof offered in the United States with the idea of suppressing similar silly statements, made for that matter no less regally or lordly. As another contemporary said recently in comment akin to this, it is well to remember that logic would cramp the style of the man and the noble lord, too, who is given to talking through his hat.

Special Libraries Can Help Plan for the Future

KNOWLEDGE of any business, both in general and in all its details, is essential to success. Research workers are striving constantly to discover new methods, new materials, that will lead to better results in industry. They are telling the story of their accomplishments month by month and week by week in the technical and scientific press. Unfortunately, a great deal of valuable work is lost to industry through failure of others to find the published reports. Studies are made over and over, experimental researches are prolonged, and even inventions are duplicated on account of lack of access to the original publications or failure to locate the articles.

Writing in a recent issue of *Special Libraries*, C. A. Capper, director of research of the Los Angeles Railway, emphasizes the importance of reviewing the development of this industry. Quoting Jacques Loeb, "a new discovery is a combination of old ideas, and these combinations are most likely to occur to the mind of the scientist, not when he is handling material things but when he is brooding over the thoughts of other men and rethinking them himself."

Mr. Capper traces the history of transportation back to the year 1661 to find the prototype of the street car, and indicates the value of the special library in making it possible to show the tremendous changes made since that time. From this he argues that leaders in the electric railway industry should conduct researches to determine the social implications involved in the service they render. Here is a real field for the special library, and one that alone can justify its establishment.

Public Transportation—Builder of Realty Values

PUBLIC transportation has long been recognized as a builder of realty values. Placing a definite figure on the worth of the service in this connection is far more difficult. As a result, the average railway man has been content with making a general statement that a certain section has been built up through the agency of his system and let the statement be accepted for what it is worth.

Perhaps the most extensive survey ever made is that recently completed by the People's Motorbus Company of St. Louis. Prompted by increasing taxation, that company set out to show that its services had increased the taxable values of districts that had not been reached by public transportation prior to the inauguration of its services. An exhaustive research was made from public and private records assisted by specialists in the field of realty values. All the statements made were taken from official records or other authentic sources. As a result of the survey it was shown that realty values in the territory served have increased more than $36,000,000 in three years. This remarkable result was backed up by detail figures, along with photographs and maps showing the condition of the various sections before and after the development.

What is of even more value from the utility standpoint was the statement that this increase in realty values has brought to the city of St. Louis new tax revenue equivalent to more than $557,280 a year. That evidence should make it hard for even a hostile city administration to continue strangling the transportation line. Be it railway or competing bus operator, it is difficult to see the justification in levying taxes that make it impossible to give service that will attract residents to new territory, building up the city and making it a more valuable entity.

It is somewhat unfortunate that comparative figures were not given showing the values of real estate where public transportation was not furnished over the same period. That would set to rest any question as to a general rise in property values, or would give a yardstick in case there had been any material rise.

There is no reason why similar surveys should not be made in other cities where similar questions have been raised. True, it may not be so easy, for in many places the development has taken place over a long period of years. But with patience and persistence it should be possible to show, not in general terms, but specifically, just how much the transportation service has meant to the community.

The Increasing Hazard that Attaches to Street Work

CLAIMS men recently in session at a committee meeting kept getting off the subject that was up for discussion to comment on the hazards that attach to the men employed by their companies for street work. The concern of these men was deep, and well it might be. They were, of course, discussing the question informally, so that it is impossible to quote the figures of injuries and deaths sustained by their employees. These figures were distressing and the recital of actual incidents, not isolated by any means, was gruesome. These men admitted they were about at their wits' end to protect their trackworkers against the reckless automobile driver, many times a man of no means, against whom it is impossible to recover damages. Warning lights are ignored or misinterpreted and actual physical barriers intended to protect the workmen in the streets have been demolished.

Several of the men who were discussing the problem were agreed that conspicuous dress for the worker in the street was, perhaps, more potent as a preventive than were ordinary warning signs or barriers. Others felt that use should be made of both these precautions. Certainly the idea of the distinctive garb or insignia for the street worker is spreading. There is evidence of this on every side. Two notable instances in the news recently are the use of red coats by the track greasers of the Wisconsin Public Service Corporation and the addition of white belts to the raiment of the street workers of the United Railways & Electric Company in Baltimore. In thus attiring their men the companies are actuated by the same motives that prompted the conception of the White Wing, the creator of which sought for a garb that would differentiate the street cleaner from the pedestrian and accentuate his presence in the street. This was, indeed, an original conception at the time. It is still potent in the degree of protection it affords. No less ingenious and no less potent are the means to which railway men are resorting.

Just as the cities themselves have come to carry on at night more of their activities, such as street cleaning, ash and garbage removal, so the railways are doing more and more street work at night and in off-peak hours. There is, however, an irreducible minimum of this work that must be done when the hazards of the streets are greatest. Naturally there is no lack of a disposition on the part of the companies to afford their men the best possible protection. The problem really appears to be to discover the form or forms of protection likely to be most effectual. Nobody seems definitely to know just what this is. Undoubtedly there isn't any answer, in the mathematical sense of an exact answer, but the more the problem and the means taken to solve it are discussed the more likely is it that the hazard will diminish. As the meeting of the committee to which reference is made plainly shows, the disposition to discuss the matter is there. It is greater opportunity for such discussion that is needed, particularly as the effectiveness of all means of protection is put to a constantly increasing test as traffic increases and the automobile comes more and more into the hands of the reckless, the incompetent and the financially irresponsible.

The Fine Art of Saying Nothing at All

EARLY in the week just ended Mayor Walker of New York said that the "new subways, the independent subways, will be operated not as a losing proposition to the city and at a 5-cent fare." He assured New York that "this subway thing is going to be all right." But he was reticent about explaining, reticent to the extent that "I am not going to confide in you now the how and the why." Naturally this comment provoked an avalanche of speculation as to the how and the why. As the Brooklyn *Times* said, the how and why are very important. Indeed they are, particularly as the Board of Transportation has declared that the cost of carrying a passenger on the new lines will be 8 cents at least, and other authorities have put the cost higher. Moreover, if recollection is correct, legislative enactment provides that the new city-owned and operated subways may be run at a 5-cent fare for an experimental period only, after which they must be operated on a service-at-cost basis.

The Mayor's statement was intended to check penetrating remarks made by Stewart Browne, who "not infrequently nags the metropolitan rulers." Anyway, the comment has seemingly appeased nobody. It was agreed that the Mayor's speech was otherwise delightful, but that his remarks "sounded too much like the old, old applesauce," as one commentator said, seemingly not forgetting the eight years of Hylan rule. But that isn't all. Later in the week the Mayor said:

"The town needs a social Mayor and a business Mayor. The social Mayor would do all the social welcoming and attend all the dinners and make most of the speeches. The business Mayor would do all the work. Being the social Mayor would be one of the most delightful jobs in the world. Being the business Mayor would be one of the most responsible. But to be both would take a superman."

Still further along in his talk the Mayor said that he had been "criticised for talking foolishness, but it seemed to me that the safest compromise was to master the fine art of saying nothing at all." So far there has been little or no evidence that the Mayor is a superman, but judged on the basis of his remarks before the United Real Estate Board, the conclusion seems inescapable that in Jimmie Walker New York has a Mayor to whom the technique of saying nothing at all has no mysteries.

Electric Railways Are an Important Asset to the Electric Industry

COMPLETE disregard of the electric railway situation on the part of many of the light and power interests is one of the exasperating circumstances that face the transportation manager from time to time. There is a certain community of interest between these two utilities. In fact, they are often held under one ownership. The profits from transportation, however, have not in recent years been as high as the profits from the ever-growing electric power industry.

It is consequently disconcerting to read the recent announcement of the Society for Electrical Development in which campaigns have been planned for 33 electrical fields and to learn that electric railway transportation is not included in the list.

By referring to statistics, it is observed that the light and power industry generates about 65,000,000,000 kw.-hr. a year. To propel the electric cars in the United States it takes 12,500,000,000 kw.-hr., equivalent to nearly 20 per cent of the entire production of the light and power companies. Only about half of this electric railway energy is purchased from light and power companies, the other half being generated in railway power houses. There are thus two prospective markets for the light and power utilities: First, to take over the power supply of companies that are now generating their own, and, second, by helping to increase the use of the electric railways. And yet the Society for Electrical Development, with whatever importance may be attached to its 33 campaigns, ignores the field of the electric railways altogether!

While the electric street vehicle is not generally a competitor of the street railway, it is quite noticeable that two of the 33 campaigns are on delivery trucking and industrial trucking. It will be a long time before electric street vehicles other than the street cars can become as good customers of the light and power utility as the street cars are today. Every new passenger that the street car can get and every new extension of service that results from many new riders are a boost for both the railway and the light and power industry.

It is not so much the loss that might arise by not being included among the list of campaigns to be promoted, but the disregard of the railway industry on the part of another that should be its closest friend is certainly cause for astonishment. Electric railways are generally accepted as a basic necessity, but it is going to take a lot of hard work and hard thinking to make them a profitable necessity.

What Is the Gross-Net Tax?

Undisputed as a Sound Method of Taxing Public Utilities, the Gross-Net Principle Is Yet Unapplied in a Single Case—The Value of a Utility for Taxation Purposes Must Be Based on Its Earning Power—The Principle of Rent Is Applied

By Leslie Vickers
Economist American Electric Railway Association

NEARLY every public utility man feels that the burden of taxation that his company is paying is a heavy one, and if it happens that he is in the street railway business he must face a host of imposts that are peculiar to his business and for the payment of which he has been singled out from other taxpayers. Here and there success has met his efforts to have these imposts removed as archaic and unreasonable—mainly relics of another transportation age—but practically nowhere has he been successful in changing a complicated and discriminatory tax system into a simple, just and scientific one. It is not that he has been lax in the matter of pointing out the shortcomings of most state taxing systems as they apply to street railways. In fact, he has pointed them out so often and nothing has happened that, in many cases, he has ceased to grumble and has settled down to bear his burden like a weary animal that realizes the load is heavy but must be borne.

But a revolt against such obvious tax discrimination and unfairness has been forming for years, and peculiarly enough it came not from the management of electric railways nor from stock for bond holders, but from impartial and disinterested students of the subject of taxation whose researches showed them the true state of affairs. The note of revolt has been sounded in economics textbooks for years and students of economics have been aware of the situation. But it seemed to be nobody's business in particular till the New York state committee on taxation and retrenchment came out with a scathing denunciation of the public utility tax law in its report of 1922.[*] After that it was taken up by the National Tax Association, which indorsed the findings of the New York state committee, namely, that the gross-net tax for public, regulated utilities was equitable, simple and efficient.

Almost every prominent economist and tax expert throughout the country has had something to say on the matter since that time, and the unanimity of opinion among these men is such as has seldom if ever been expressed with regard to any other taxation method. Not one dissentient voice has been raised—and yet the system which they so enthusiastically recommend is actually not in operation in any one state!

It is not the purpose of this article to relate the difficulties that beset the reformer in state taxation methods, for almost every executive has had experience in this field. Its purpose is to outline in brief the gross-net tax so that its provisions may be understood by everyone in the utility field to which we seek to apply its provisions.

In the first place, it is obvious that regulation has introduced an entirely new element into our business, and one that was not considered when most of the street railways came into existence. Of course the word "franchise" itself connotes some degree of regulation, but the operator of 30 or 40 years ago never dreamed of regulation as we have it today. The street railways in every state can now be classed as a thoroughly regulated industry, removed entirely from the field of business economics. That is, the economic laws that govern ordinary businesses have been suspended and in their place there have been substituted man-made laws that prevent the economic laws from operating. A merchant or manufacturer buys and sells in the best market he can find in open competition with others in his line of activity, and his profits are dependent on his business ability and the prevailing degree of prosperity. A street car operator is limited by franchise as to where he can operate, what service he must give, and what fares he can charge. Furthermore, the upper limit of his earnings is set as a "reasonable return" on the value of his property or his investment, as the case may be, and while he assumes all the risk that characterizes the business of the ordinary *entrepreneur* he stands none of the chances of making the profits for which the ordinary *entrepreneur* enters business.

In a word, he may be able to earn economic interest if his rates are sufficient, his traffic favorable and his management good; but he is excluded by the nature of his business from making economic "profits." This being so, the question naturally arises, how should his obligation to the state in the form of taxes be measured? Obviously the value of his property, if by this we mean his investment, is no criterion, for even if the rate of fare be adequate for the service rendered, his volume of traffic may be insufficient to produce a reasonable return.

The number of electric railways today that are operating under such conditions is legion. It is only when value is measured by earnings, or with earnings as the principal factor, that this becomes a satisfactory yardstick. To such a degree is this recognized that in almost every state where the so-called *ad valorem* method is in use, it is the earnings factor that is given the greatest weight.

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[*] ELECTRIC RAILWAY JOURNAL has at various times published results of this work. In the issue of Feb. 4, 1922, appears an abstract of the voluminous report to the New York State Legislature, submitted by a committee of the National Tax Association. This committee, appointed in 1920, was headed by Hon. Frederick M. Davenport, then member of the New York State Senate, as chairman. The report covered the utility tax situation in New York.

On Feb. 16, 1923, Senator Davenport delivered an address on the same subject at the midwinter dinner of the American Electric Railway Association in Washington, D. C. This address was abstracted in the issue of Feb. 17, 1923.

In the issue of the JOURNAL for April 7, 1923, an abstract of a report to the National Tax Association was given. The committee found that a utility tax on the basis of an equality with other business was sound. In its analysis the committee recommended a form of gross-net tax as perhaps the fairest to the utility and the government.

PRINCIPLE OF RENT APPLIES TO THE FRANCHISE VALUE OF THE REGULATED UTILITY

But why consider any other factor than earnings? Assuming that the management is capable and honest, earnings are the only criterion by which we can measure the value of a franchise which some public body has granted to some private group. In fact, under regulation we should cease to talk about the taxation of public utilities at all and begin to speak of the "rent" which a utility must pay to the state for the franchise granted to it. And how is rent measured? Of two pieces of land, one on the prairie and one in the heart of New York, the former commands a low rent because its earning power is low and the latter commands a high rent because its earnings are high. While it is the position of the land that gives it rental value, it is the terms or conditions of the franchise that give the utility its value. There is such a thoroughgoing parallel between the two cases that it is difficult to conceive of any argument against the application of the principle of rent to franchises as to land—and the rental value is measured by earnings alone!

It is the principle of rent that the gross-net tax proposes to apply and secure for the state in the form of taxes, exactly what its franchises are worth, measured by earnings; or in other words, to have the state charge the utilities an economic rent for their franchises. Is this unfair to any one? Certainly not to the state, which can only expect to have returned to it what its conferred franchises are worth, and which does not, in theory at least, either overcharge or undercharge. Much honest effort has been spent in the past in trying to determine exactly what the state should charge for its franchises. It is obvious that its franchises differ in value and some yardstick should be available for measuring these differences. No one would think of paying the same rental or tax for a newspaper stand as for the right to supply a city with electricity. What makes the one more valuable than the other? Solely the possibility of earnings—and the one is more valuable than the other directly in proportion to earnings.

Further, this method is not unfair to the utility, which, far from seeking to avoid its civic obligations, is anxious, in its own interest and those of its customers, to know what it should pay for the privilege of owning the franchise. No one, even with the greatest sagacity and foresight, can tell in advance how a venture will turn out and no one can say until the earnings statement appears what a franchise is worth. It all comes back to this, that earnings alone measure the value of a franchise and determine the obligations of the operating company to the civic body that grants the franchise.

OBJECTIONS TO TAXATION OF NET EARNINGS ALONE

Logically, then, it might appear that the way to tax public utilities would be upon a simple net earnings plan. But it must be remembered that this would result in complete escape from taxation of many corporations and the introduction of an unhealthy principle of the avoidance of all state obligations. It is generally agreed that every individual and every corporation enjoying the benefit of government should contribute something to the cost of such service, and that these services are provided for the fortunate and unfortunate alike. Therefore there should be some minimum payment exacted from every individual and corporation, whether they are prosperous or not. Besides, the expenses of the modern forms of government are not sufficiently flexible to permit of easy adjustment to the great yearly changes in income that might follow the introduction of a simple net earnings plan. The gross income tax represents both the state's security against abnormally lean years and the corporation's obligation to contribute to the expenses of the body politic. Both of these are important enough to justify some degree of taxation no matter what the earnings situation may be.

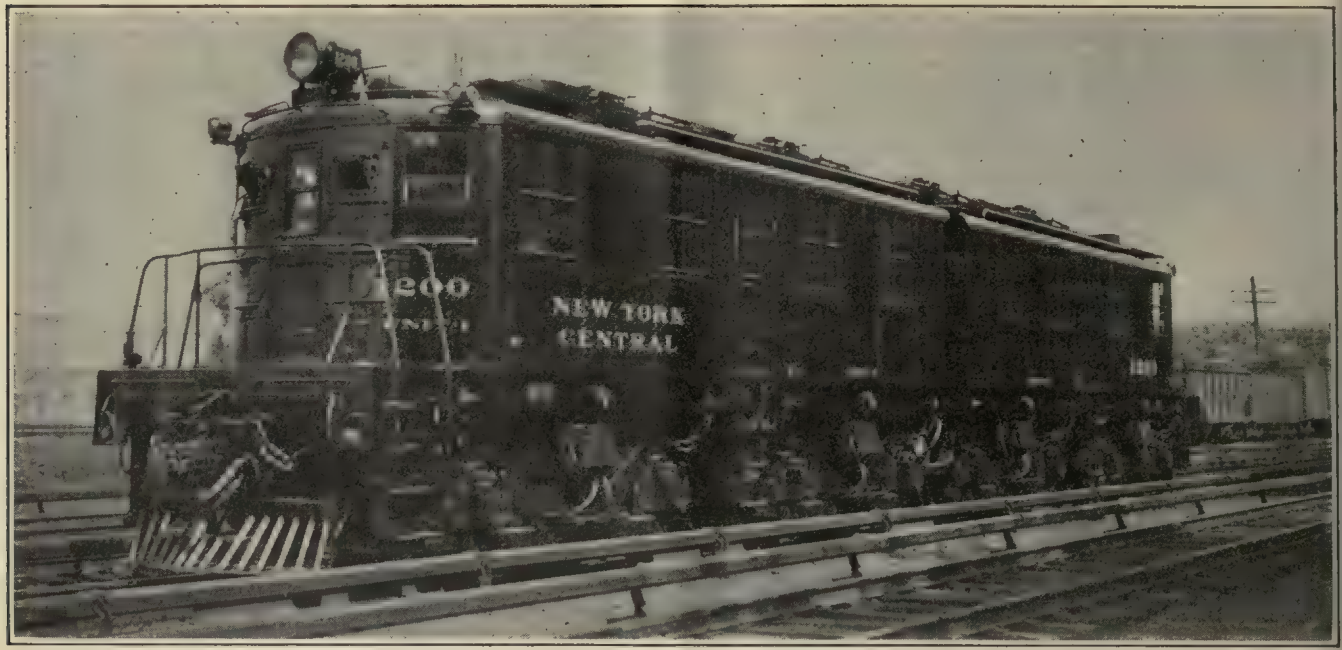
What are "gross earnings" and what are "net earnings"? The New York Legislature committee defined them as follows: "The committee suggests that gross earnings be defined as all receipts from the operation of a public utility and that net earnings be defined as net earnings from the operation of a public utility after deduction of operating expenses and taxes assignable to operation except special franchise taxes in this state, or the gross-net tax itself." In the case of New York State it was necessary to consider the special franchise taxes, but the committee recommended their removal by constitutional amendment and the replacement of all taxes by the gross-net tax. The important feature about the gross-net tax, in addition to its equity, is its simplicity, for it is designed to replace all other taxes.

There are several ways of applying the gross-net tax, but the simplest of them is "one which imposes a varying rate on gross earnings, the variation in rate depending on the relationship of net to gross, the companies paying higher taxes as their profits increase and lower taxes as they decline." The exact percentages to be applied will vary according to the tax needs of the state and to the willingness of the tax assessing bodies to recognize what is fair as between public utilities themselves and as between public utilities and other corporations. But in order to bring in to the state of New York about the same amount of taxes by the gross-net method as are now collected by other methods the committee made the following suggestion:

Every company shall pay an annual tax which shall be based on gross earnings and which shall be the percentage of gross earnings fixed herein:

Net Earnings in Per Cent of Gross Earnings	Per Cent of Gross Earnings to Be Paid as Tax
When less than 5	1
Between 5 and 10	1¼
Between 10 and 15	1½
Between 15 and 20	1¾
Between 20 and 25	2
Between 25 and 30	2¼
Between 30 and 35	2½
Between 35 and 40	2¾
In excess of 40	3

That is all there is to the gross-net tax—it is simplicity itself, it achieves equality, and it metes out justice. Unfortunately, its adoption by the various states is not an equally simple matter, for in some cases a constitutional amendment would be required, and in almost all an attempt to tax public utilities by



This Locomotive Pulled a Train of 108 Cars at a Maximum Speed of 32 M.p.H.

a different method would provoke a storm of protest from other groups upon whose shoulders must fall any burden from which the public utilities might be relieved.

But even constitutional amendments, both federal and state, have been, and can be again, brought about by enlightened public opinion; and as the sphere of public utility influence through customer ownership and users increases, so will the demands for justice in taxation for the utilities increase.

No tax change of this kind, however desirable and just, can be brought about by ordinary political means, but it can be brought about by the intensive education of those who use the services of the utilities and bear the burden of taxation. The education of their customers is one of the duties of management in this industry, and if they apply themselves to it the desired results are sure to follow.

A Mile-Long Train Pulled in Electric Locomotive Test

New York Central Gets First of Two Large Freight Locomotives Which Will Be Used in Handling Freight Between New York City and Harmon

WITH a capacity more than double that of any electric freight engine already in service on the New York Central lines out of New York City, a large, dual-unit locomotive was given a series of exhaustive service tests by railway officials on Sunday, Sept. 19. A train of 108 freight cars, a mile in length, was hauled for more than 100 miles at a maximum speed of more than 32 m.p.h. Three round trips in all were made between Harmon and Morris Heights by the 170-ton locomotive with its trailing load of 3,000 tons.

The train of cars used in the test was said to be the longest ever seen in New York City. Only about half as many cars may be handled effectively by electric switching locomotives previously used by the railway. The new locomotive is of the swivel type, with two units, the cabs of each being connected by an articulated joint. Centering devices are also provided which normally hold the two cabs in line, although they are capable of relative movement on sharp curves. The swivel trucks are provided with centering devices to prevent oscillations when running at the maximum speed of 60 m.p.h.

Eight motors, using forced ventilation, furnish the motive power, one being mounted on each axle. Multiple-unit control is provided so that the entire locomotive may be operated from either end. The underframe construction is unusual in that the cab platform consists of an integral casting, made by the Commonwealth Steel Company, instead of being built up of fabricated material, as is usually done with so large a locomotive. The truck frames are also integral steel castings.

Electrical equipment for the new locomotive was provided by the General Electric Company, while the unit was constructed by the American Locomotive Company. It is the first of two for use in main line work on the New York Central between the city and Harmon and on the west side to 72d Street when that section is electrified. Officials of the railway and representatives of the General Electric Company were present at the tests, which included motor temperature, current consumption, train speed and acceleration.

Three methods of measuring motor temperatures were used. These consisted of applying thermometers to the motors, using special exploring coils placed in the armature slots and connected through slip rings to instruments in the caboose coupled directly behind the locomotive, and measuring the resistance of the motor windings. Temperatures by means of the exploring coil method were taken at regular intervals throughout the entire test, while the two other methods were employed at the beginning and end of each run. Results of the tests indicated that the locomotive could haul the specified tonnage without injurious heating.

H. A. Currie, assistant electrical engineer New York Central, was in charge of the tests and was assisted by J. T. Seaver, assistant engineer electrical engineering division; J. A. Carmody, superintendent of electrical equipment, and a crew of 24 of the electrical staff.

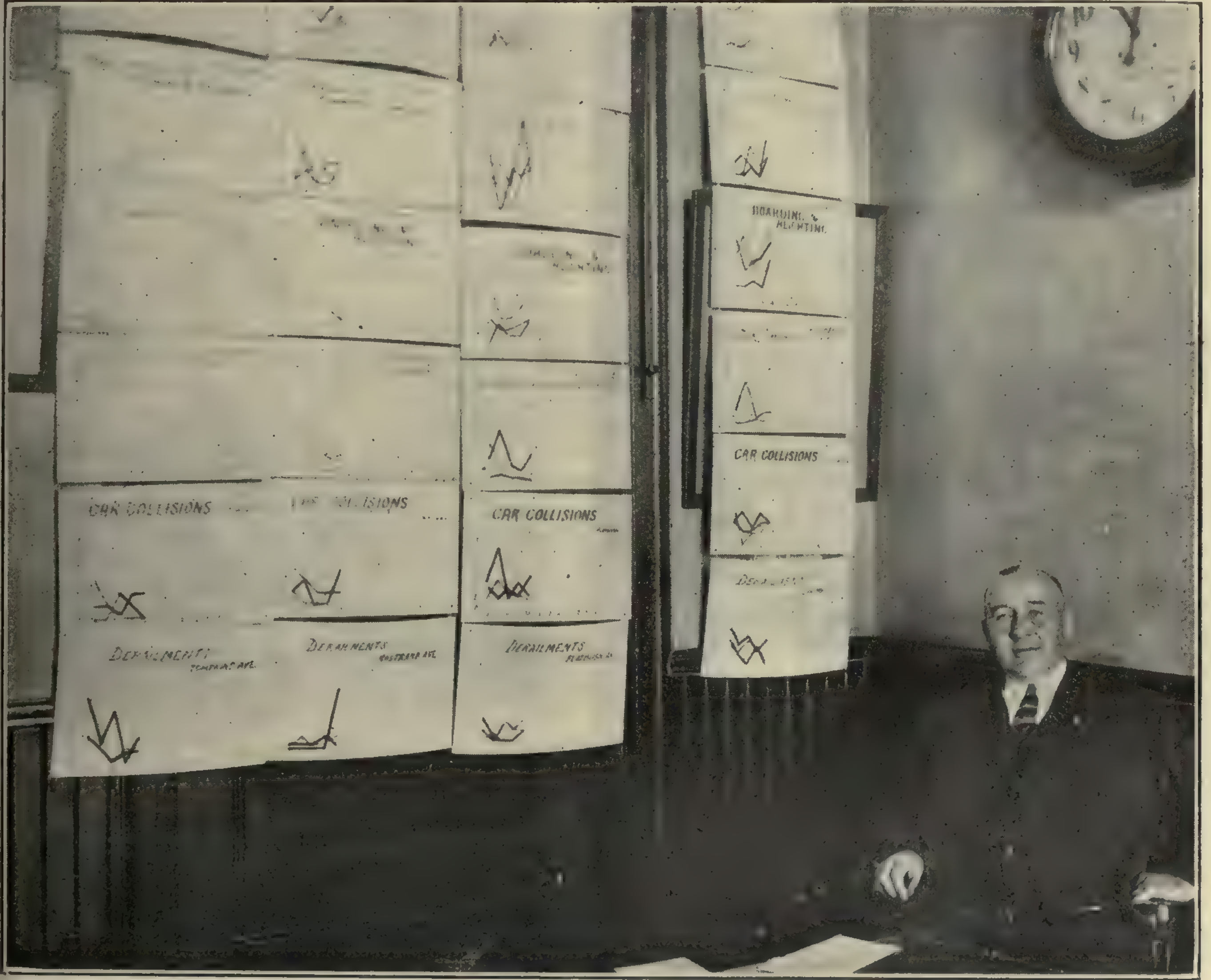
Brooklyn City Railroad Pays Bonus for Accident Immunity

Extended Accident Prevention Work Is Being Conducted on Prominent Brooklyn Property—Spot Maps, Charts Showing Accident Data and Safety Bulletins Are Posted Prominently in Each Operating Depot—Method of Reporting Accidents Carefully Worked Out

MUCH attention is being given by the management of the Brooklyn City Railroad to accident reduction. The latest step in an extended effort along this line is the offer of a bonus of $5 to operators for every 30 days without accident. An account of the establishment of these prizes was published on page 289 of the issue of this paper for Aug. 21, 1926. Briefly, the company agrees to pay $5 to each conductor, motorman and safety car operator for every 30-day working period, completed on or before Nov. 30 of each year, during which the employee operates his car without an accident. This 30-day working period does not mean a calendar month, but days actually worked, i.e., excluding days off. The only proviso is that to receive credit for a day the man must work at least eight hours of the day. An accident for which the operator is in no way responsible will not be counted against him. The plan went into effect on Aug. 1, 1926, and payment will be made to the men on Dec. 15 for the period up to Nov. 30 of each year.

"Spot" Maps Help Toward Safety

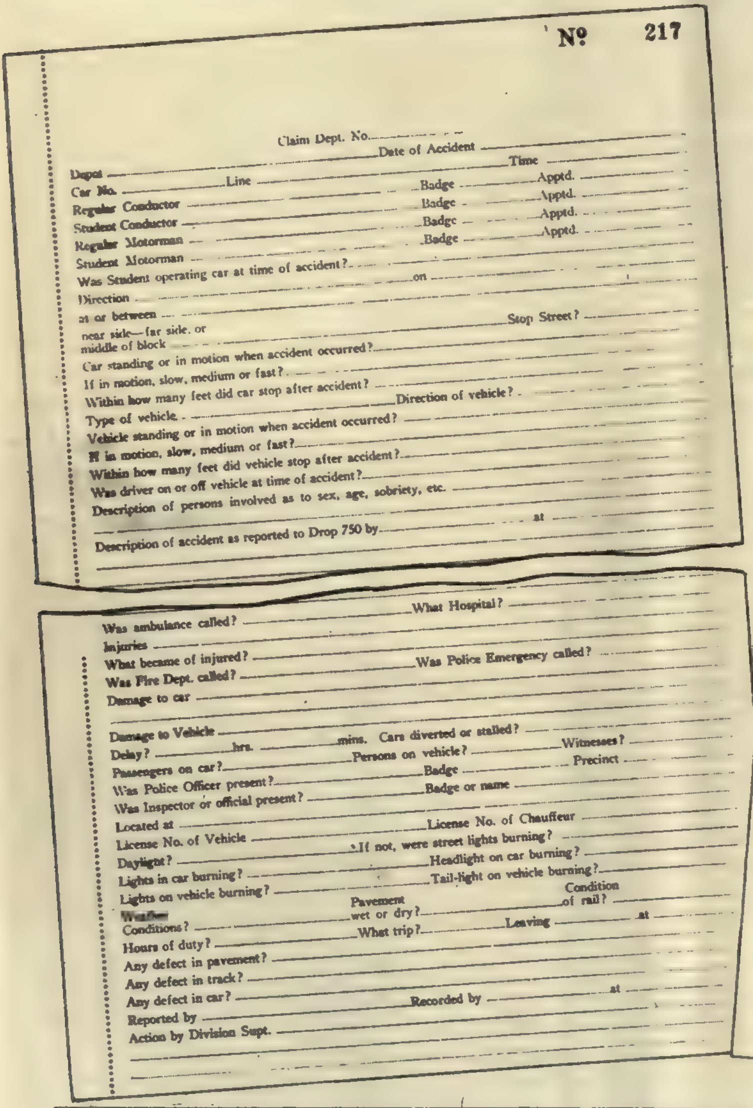
As explained, this bonus offer is only one step of a large number which the company has taken to reduce accidents and to determine the cause of those which occur. One method employed along this line for some



Detailed Comparative Charts of the Accidents on Each Division Are Kept Posted in the Office of Each Division Superintendent

time is the practice followed now by a number of electric railway companies of compiling "spot" maps to show the location and character of every accident on the line. On the Brooklyn City Railroad these spot maps are made more definite by having a separate map for the routes operating out of each depot and of compiling these maps monthly. In other words, there are seven maps, one for each depot, and on each map the location of every accident is indicated each month by a pin. The pin heads are of different colors to identify the kind of accident. The classification used covers twenty different kinds of accidents, as follows:

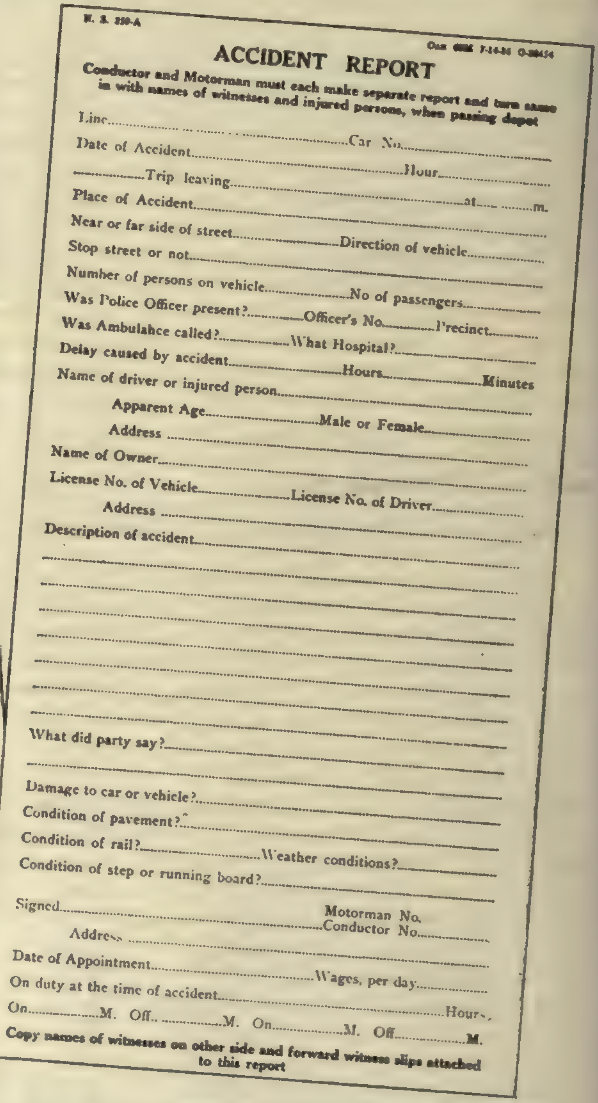
A. Car collisions (violation of operation rules.)
B. Car collisions with cars for foreign companies.
C. Car and vehicle collisions.
D. Persons or animals struck by cars.
E. Boarding or alighting accidents.
F. Sudden starting or stopping, fast operation around curves, etc.; throwing passengers to floor or against seat or side of car.
G. Derailments.
H. Life guard falling and damaged.
J. Trolley wire and trolley poles.
L. Defective condition of pavement or track causing accidents.
O. Negligence in handling doors, gates or seats.



Nº 217

Claim Dept. No.
Date of Accident
Time
Depot
Car No. Line Badge Apptd.
Regular Conductor Badge Apptd.
Student Conductor Badge Apptd.
Regular Motorman Badge Apptd.
Student Motorman
Was Student operating car at time of accident?
Direction on
at or between
near side—far side, or middle of block Stop Street?
Car standing or in motion when accident occurred?
If in motion, slow, medium or fast?
Within how many feet did car stop after accident?
Type of vehicle. Direction of vehicle?
Vehicle standing or in motion when accident occurred?
If in motion, slow, medium or fast?
Within how many feet did vehicle stop after accident?
Was driver on or off vehicle at time of accident?
Description of persons involved as to sex, age, sobriety, etc.
at
Description of accident as reported to Drop 750 by

Was ambulance called? What Hospital?
Injuries
What became of injured? Was Police Emergency called?
Was Fire Dept. called?
Damage to car
Damage to Vehicle Cars diverted or stalled?
Delay? hrs. mins. Witnesses?
Passengers on car? Persons on vehicle? Precinct
Was Police Officer present? Badge
Was Inspector or official present? Badge or name
Located at License No. of Chauffeur
License No. of Vehicle If not, were street lights burning?
Daylight? Headlight on car burning?
Lights in car burning? Tail-light on vehicle burning?
Lights on vehicle burning? Condition of rail?
Weather Conditions? Pavement wet or dry?
What trip? Leaving at
Hours of duty?
Any defect in pavement?
Any defect in track?
Any defect in car? at
Reported by Recorded by
Action by Division Supt.



R. S. 250-A

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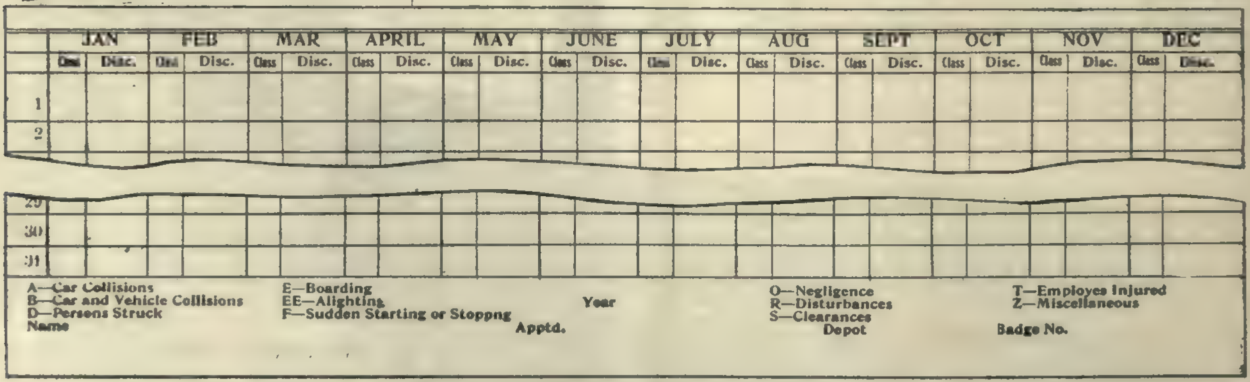
ACCIDENT REPORT

Conductor and Motorman must each make separate report and turn same in with names of witnesses and injured persons, when passing depot

Line.......Car No.......
Date of Accident.......Hour.......
.......Trip leaving.......at.......m.
Place of Accident.......
Near or far side of street.......Direction of vehicle.......
Stop street or not.......
Number of persons on vehicle.......No of passengers.......
Was Police Officer present?.......Officer's No.......Precinct.......
Was Ambulance called?.......What Hospital?.......
Delay caused by accident.......Hours.......Minutes
Name of driver or injured person.......
Apparent Age.......Male or Female.......
Address.......
Name of Owner.......
License No. of Vehicle.......License No. of Driver.......
Address.......
Description of accident.......
What did party say?.......
Damage to car or vehicle?.......
Condition of pavement?.......
Condition of rail?.......Weather conditions?.......
Condition of step or running board?.......
Signed.......Motorman No. Conductor No.......
Address.......
Date of Appointment.......Wages, per day.......
On duty at the time of accident.......Hours,
On.......M. Off.......M. On.......M. Off.......M.

Copy names of witnesses on other side and forward witness slips attached to this report



	JAN		FEB		MAR		APRIL		MAY		JUNE		JULY		AUG		SEPT		OCT		NOV		DEC	
	Class	Disc.	Class	Disc.	Class	Disc.	Class	Disc.	Class	Disc.	Class	Disc.	Class	Disc.	Class	Disc.	Class	Disc.	Class	Disc.	Class	Disc.	Class	Disc.
1																								
2																								
29																								
30																								
31																								

A—Car Collisions
B—Car and Vehicle Collisions
D—Persons Struck
E—Boarding
EE—Alighting
F—Sudden Starting or Stoppng
O—Negligence
R—Disturbances
S—Clearances
T—Employes Injured
Z—Miscellaneous
Year
Name Apptd. Depot Badge No.

The Accident Report Blank Made Out by the Car Crew, at Right, Covers the Principal Points. The More Comprehensive Blank at the Left Is Used by the Accident Clerk at Depot. Below, Individual Accident Records Are Kept on This Blank for Each Transportation Employee

Q. Equipment parts broken or defective, not otherwise classified.
R. Disturbances.
S. Clearance accidents, passenger striking "L" columns, passing cars or other obstructions.
T. Employees injured.
V. Windows broken.
W. Substances falling from "L" structures, etc.
X. Persons falling on stairways or platforms.
Y. Passengers falling from platforms to track.
Z. Miscellaneous.

It will be noted that as there are twenty classes of accidents and 26 letters in the alphabet, some letters through the list are undesignated. This is so that additions to the classification can be made, should any be thought desirable in the future.

Two sets of maps of this kind are brought up to date daily. One set is kept in the office of the general manager of the company. There is also a map posted in a conspicuous place in each depot, correspondingly marked for the routes operating out of it. This map is also brought up to date daily. It is mounted in a wooden frame and illuminated at night by lamps above it. This enables every man operating out of that depot to keep in immediate touch with the accident situation of all cars on the route, notice the dangerous crossings as regards vehicular collisions or collisions with other trolley cars, boarding and alighting accidents, clearance accidents, etc. These charts are also used as the basis for conferences on ways to reduce accidents, talks to the men by representatives of the management, division superintendents, etc.

COMPARATIVE CHARTS ARE ALSO COMPILED MONTHLY

Besides the spot maps, the company compiles monthly for posting in every depot a comparative graphic representation of the accidents occurring during the month for the past three years on the routes operating from that depot. This chart gives the accident data on the basis of each 10,000 car-miles run and is printed in colors on a poster measuring 14 in. wide by 22 in. high. The chart also carries a list of the unreported cases for the month, i.e., those cases which are brought to the attention of the management through its claims department or otherwise but have not been reported by the crew. Of course, in some cases, perhaps in most cases, the lack of a report does not mean the crew or operator was negligent in not reporting the case. The motorman, conductor or safety car operator may not have known that such an accident occurred, as when the rear of a car hits an automobile a very slight blow on rounding a corner, or when a passenger who has alighted is struck by a vehicle while passing to the curb.

In the original chart, as shown in an accompanying illustration, the 1926 line is printed in red, the 1925 line in yellow and the 1924 line in green. In the illustration these different colors can be indicated only by the relative darkness of each line.

The data on which these charts are based are available on the tenth of the month following that covered by the comparisons. The charts are then immediately printed and are posted in the depots not later than the fifteenth of the month. As will be noted, depots are arranged in the order of accidents, the depot having the lowest record of accidents per 10,000 car-miles appearing first.

Publication of the number of unreported accidents has been found to stimulate the reporting of accidents which members of the crew might not otherwise have reported.

Detailed charts of different classes of accidents by the cars operating out of each depot are also posted in each depot for the use of the division superintendent and the men under his direction.

HOW ACCIDENTS ARE REPORTED

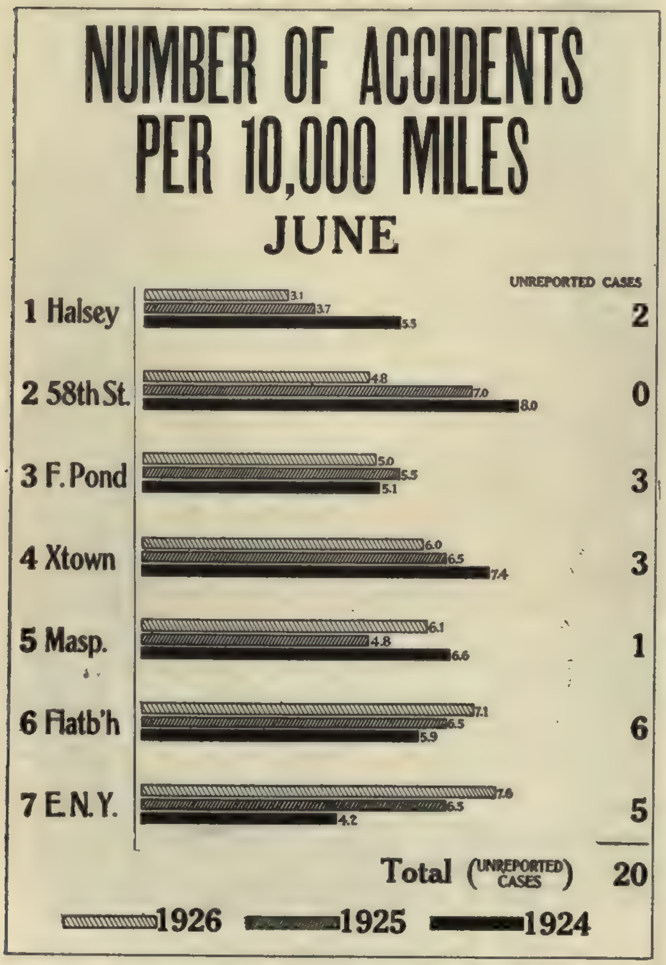
There is a great variety in the forms of accident reports used by electric railway companies, but the blanks employed by the Brooklyn City Railroad possess perhaps more than the usual interest because of the high traffic density on the streets in Brooklyn, as well as the fact that nearly all of the lines of the company are on city streets.

Spot Maps of This Kind Help Car Crews to Know Where Accidents Are Apt to Occur. They Are Framed and Hung in Each Depot

The first report made of an accident by the conductor, motorman or operator is an oral one. If there is a street inspector or supervisor present or near at the time of the accident, the facts are told to him and he telephones them to the depot of that route. If there is no such official in the immediate neighborhood, the car operator is instructed to tell the facts to the first inspector or supervisor whom he may pass, and also to telephone the depot about it at his first opportunity. The written report of the accident is made out by the operator after he returns to the depot at the end of his trip and is dropped into a special slot box for that purpose.

In all telephone reports of accidents, whether by an inspector or operator, the facts are reported in the order followed in the standard report blank. They are taken down over the telephone by the depot clerk in this same order and entered in duplicate on the standard accident blank. The clerk then immediately calls up the main office, asking for "drop 750," and gives a summary of the information reported. He then sends the original of the blank he has made out to the main office and retains the duplicate in his accident report binder.

The clerk at headquarters receiving this information keeps in his typewriter six tissue sheets, and as the information is given, he types it as it comes over the telephone. One copy is then sent directly to the claim department and other copies to the heads of other departments concerned. Thus, if the accident was caused by any defect in the track or developed any such defect, a copy would be sent to the head of the track department of the company.



Charts with Comparative Accident Records for the Past Three Years Provide Another Way of Stimulating Care in Operation

The blank at the right of the two shown on page 570 is that used by the car crew in making reports. That at the left in the group is the one employed by the depot clerk.

As explained, a report of every accident of which there is a record goes promptly to each division superintendent so that he has extended details shortly after the occurrence. He also has the names of the transportation employees involved and can interview them promptly as to their responsibility and other details. If he feels as the result of this inquiry that the men should lose the chance of their bonus for the 30 days concerned, he tells them so and the men have an opportunity at this time to set forth any reasons why they think the accident should not count against the payment of their bonus.

OTHER OFFICE AND CLAIM DEPARTMENT RECORDS

In this statement of record kept of accidents, mention should be made of the card index of accidents kept individually for every motorman, conductor and safety car operator. There are two such records, one at the depots and one at the main office. The depot record is kept on a card with space for each day during the year on which the classification of the accident and the discipline administered can be entered. This card record is kept alphabetically by names of employees. A very similar record is kept in the main office except that there the record is kept in Kardex index record, which is considered more convenient because records have to be kept here of all the platform men on the system, numbering altogether about 2,400.

It is considered desirable to keep each division superintendent informed of the later history of every reported accident on his division. This is a plan sometimes neglected on other properties. On the Brooklyn City Railroad, in every case where a settlement is made amounting to more than $50, the claim department gives all facts to the division superintendent together with any special points which may have come up, indicating the advisability of a change in operating practice from that depot, or special instructions to the motorman or conductor involved in the accident.

RESULTS HAVE BEEN ENCOURAGING

The safety program of the company, as outlined, is in the general charge of A. L. Hodges, assistant to the general manager, and the board of directors feels that its policy of checking accidents and rewarding operators for immunity from accidents, as described, is giving good results. Previous to the establishment of the bonus system, the company gave credit for immunity from accidents for 25 consecutive working days. The merit and demerit system of discipline is employed on the Brooklyn City Railroad, and these credits were added to individual records in the usual way. Since the announcement of the bonus system, these credits are no longer entered on the employee's record.

Still another practice of the company has helped to reduce accidents, it is believed. This is the plan of bringing suits for damages to cars caused by vehicular collisions for which the operator of the vehicle was responsible. Information of this kind comes in, of course, with the accident reports already described. If, after an examination, the company believes that its employees were not responsible for the accident but the driver of the other vehicle was, a letter is sent to the owner of the vehicle causing the injury, setting the damages at a definite figure and stating that the company expects to be reimbursed. If no reply is received within a reasonable time, the matter is turned over to the claim department, which is asked to bring suit.

The present cost of damages on the Brooklyn City Railroad amounts to about 6 per cent of the gross receipts, which is considered low for a property operating purely city service under the congested street conditions existing in Greater New York. It is hoped that even this figure will be reduced.

London Tramways Improve Service to Meet Bus Competition

Discontinuance of Trailer Operation and Installation of More Powerful Motors Have Resulted in a Substantial Increase of Speed —Better Lighting and Use of Comfortable Plush-Upholstered Spring Seats Have Made the Car Interior More Attractive

Westminster Bridge, Where Tramcars and Buses Are in Active Competition

LONDON is a battleground of competitive transportation undertakings. Illuminating figures are quoted in a recent report issued by the London and Home Counties Traffic Advisory Committee showing the rapidity and extent of the growth of bus competition with tramways during the last six years. In January, 1920, the number of buses plying for hire in competition with the municipal tramways was 612, with an average seating capacity of 34. Four years later they had increased to 1,166, and in January, 1925, to 1,318, with an average seating capacity of 50. At this point the position appears to have been stabilized by action taken under the London traffic act of 1924. Conditions such as these convinced those responsible for the operation of tramways of the prime necessity of bringing them to the highest standard of efficiency both in respect to speed and comfort. With this end in view various steps have been taken to increase the popularity of the service.

SPEED INCREASED TO 9.51 M.P.H.

According to the records of the London County Council Tramways the average speed of cars has risen from 9.29 m.p.h. in 1922-1923 to 9.51 m.p.h. in 1924-1925. This increase in two years is the more noteworthy because of the densely congested and thickly populated district served by the L. C. C. system.

Two factors have been primarily responsible for the improvement — first, the discontinuance of trailer operation, and, second, the installation of higher powered motors.

In 1922 the London County Council Tramways was operating trailers on three important routes on the southern part of the system, namely, Victoria Embankment to Norbury, Victoria Embankment to Merton, and London Bridge to Greenwich. At that time there were 150 trailers on the system. While it was felt by the management that trailer operation had been satisfactory at the time of its introduction, more recently it had become a source of serious delay by reducing the speed of all cars on routes where trailers were used. Moreover, in bad weather the open upper decks of the trailers were not being used to the fullest extent. For these reasons it was decided to make careful investigations to determine whether or not it was desirable to continue the operation of trail cars. Tests were carried out on the Merton and Streatham routes, in order to make a comparison between the operation of routes with and without trailers.

From these tests it was found that the operation of single units possessed many advantages over the operation of trailers, including reduced running time, time saving in changing ends at the terminus and increased revenue. On the Merton route the reduction in running time amounted to six minutes in an average round-trip time of 96 minutes, or in other words an increase in speed of 0.7 m.p.h. On the Norbury route the time saved was four minutes in the morning and six minutes

On Many Streets in London Tramways and Buses Vie with Each Other for Traffic

in the evening on an average round trip of 99½ minutes, equivalent to an increase in speed of 0.5 m.p.h. As a result of these tests it was decided that it would be more economical to operate the service with motor cars only and discontinue the use of trailers on all of the tramway lines.

In March, 1923, the London County Council Tramway management came to the conclusion that it would be possible to effect considerable improvements and economies in the service by substituting modern, up-to-date motors for the older equipment on the cars used on certain routes where conditions were favorable to the attainment of higher average speeds. The latest type of car purchased by the Council had been fitted with high-power ventilated motors and had been in operation sufficiently long to convince the officials of its value. As a result of using the new type of motor it had been found that considerable reductions were effected in the cost of operation, while at the same time there was an increase in speed.

As the first step in this direction, 200 cars built in 1907-1911 were equipped with two 60-hp. motors each in place of 42-hp. motors. The latter were substituted in place of 35-hp. and 30-hp. motors on older cars. In February, 1924, an extension of this scheme was decided upon and an additional 200 cars were equipped with 60-hp. motors. Thus a total of 800 cars were re-equipped with motors of higher capacity, the cost being about £300,000.

At Left, Spring-Cushion, Plush-Upholstered Seats Are Being Installed on Cars of the London County Council Tramways to Encourage Traffic. At Right, Installation of Additional Lamps Gives 60 Per Cent Better Illumination Inside the Car

The effect of these changes on the speed of operation is shown in the accompanying table.

During the war and immediately afterward it was not possible for the London County Council to maintain the cars and track in their usual efficient state. For this reason figures for years prior to 1920-1921 are not given. By 1922, however, the pre-war condition had been regained, and it was obvious that something of a positive character was necessary before any substantial improvement in speed could be attained. The discontinuance of trailer operation and the installation of more powerful motors have accomplished this end. As shown by the tabulated figures there has been an increase of 0.25 m.p.h. in speed and an increase of 5.5 miles operated per car per day.

London County Council Tramways Is Improving the Quality of its Service by Installing More Powerful Motors and Rearranging the Interior of Cars of This Type

Assuming that two trailers are equivalent to one motor car, it will be seen that the average number of cars in use in 1924-1925 was only ten more than in 1922-1923, but the total mileage was 4,500,000 more. The increase in car mileage was from 63,500 to 68,000, or more than 7 per cent. Had this been accomplished entirely by placing additional units in service, 100 more cars would have been required. Thus the increase in speed has been equivalent to the provision of 90 new cars on the system, or, allowing for necessary spare equipment, the saving is equivalent to the annual interest charges on 100 new cars and their operation for fourteen hours a day.

RESULTS OF EQUIPMENT MODERNIZATION

Year	Average Speed, M.p.H.	Average Number of Cars in Use		Miles per Day per Car	Total Mileage, Millions
		Motor Cars	Trailers		
1920-21	9.02	1,278	116	120	57½
1921-22	9.13	1,325	112	121	59½
1922-23	9.29	1,421	76	121½	63½
1923-24	9.49	1,445	17	124½	64*
1924-25	9.51	1,469	...	126¼	68

*Strike during ten days.

CARS MADE MORE COMFORTABLE

After having made these changes, which increased the speed of tram cars to the same or greater than that of the buses, the management next turned its attention to increasing the passenger comfort of the vehicle. An experimental car was built embodying many improvements in design. Five cross seats on each side of the center aisle with longitudinal seats in each of the four corners were provided on the lower deck. The floor was covered with a thick cork carpet. The number of electric lamps in the lower saloon was increased from six to ten. Pneumatic signal bells were arranged for the convenience of passengers. The ceiling hand rails were rearranged to suit the new seats. Outside the car was painted in vermilion, in striking contrast to the dull chocolate color of the other cars. Preliminary experience with this car was so satisfactory that in August the London County Council authorized the equipment and rearrangement of 100 more cars according to the same plan.

Many other tramways in the British Isles are faced with similar problems of bus competition and are considering taking similar steps to meet the situation. The subject was discussed at length at the annual meeting of the Municipal Tramway Association Sept. 8-10. An abstract of these proceedings appears on page 584.

To Park or Not to Park

IN BEHALF of rational city planning and sound municipal finance in connection with street widening, transit construction, etc., the *American City Magazine* in its October issue suggests a statement of principles concerning parking and storage of automobiles applicable in all cities. The first of these is to the effect that streets are primarily provided for general use as lines of communication and that the rights of the different classes of traffic to unlimited use of the streets, including the right to park, are subject to the public and civic welfare. Another states that the right to move a car is superior to the right to store a car on the public ways, although there is no objection to unlimited parking where it does not interfere with the expeditious movement of traffic and with reasonable access of vehicles to the curb. All future department stores, theaters, tall office buildings and other business structures catering to large numbers of customers or tenants should be built with the knowledge that space must be provided off public streets for loading and unloading merchandise and storage of customers' automobiles.

Favorable comment on these principles is made in the same issue by Robert Whitten, city planning consultant, New York; S. J. Williams, director public safety division, National Safety Council; Walter Jackson, fare and bus consultant, Mount Vernon, N. Y., and A. H. Outhank, chief domestic commerce division, U. S. Department of Commerce.

Youngstown Adopts Series Car Lighting

Twenty Lamps in a Single Circuit Provide Improved Illumination at Lower Cost—Newly Developed Cutout Makes Detection of Dead Lamps and Replacement Easy

By H. H. Helmbright
National Lamp Works, General Electric Company

NOT the least among the features of the new cars of the Youngstown Municipal Railway, mentioned in the article in last week's issue by R. N. Graham, manager of this company and the Pennsylvania-Ohio Electric Company, is the system of lighting. A series of twenty lamps on one circuit replaces the ordinary five-in-series method.

Remove any one of the inclosing shades above and there you will find an automatic cutout lamp, used for the first time as standard equipment by any operating company. This new lamp is the result of several years work on the part of the incandescent lamp development laboratories of the General Electric Company, located at Cleveland, Ohio. Several preliminary installations were described in ELECTRIC RAILWAY JOURNAL for Aug. 22, 1925, page 275.

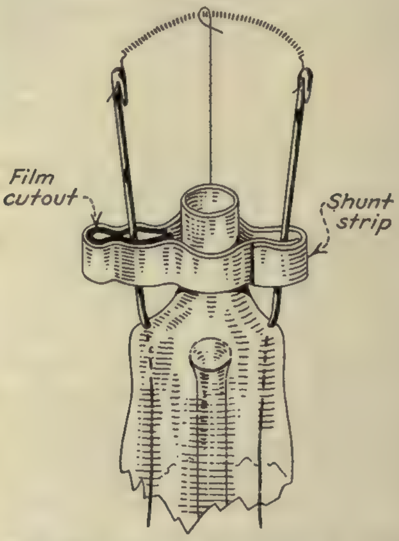
In order to appreciate the real meaning of this new development it might be well to explain the difficulties which have been experienced in the past when attempting to use gas-filled lamps on street railway circuits. Past practice has called for the operation of vacuum-type lamps arranged in series circuits of five lamps each. When Mazda C (gas-filled) lamps of the ordinary type are operated on such circuits serious arcing is encountered when a lamp burnout occurs while the circuit is alive. This arc, due to the conductive effect of gas, is often sustained indefinitely. It will continue to melt away the lead wires and carry on through to the lamp base, usually ruining the socket and wiring. This difficulty has been a serious handicap to the street railway field, for the latter has not been able to keep pace with the better illumination trend in other fields using gas-filled lamps.

The new lamp is so constructed that the burnout arc is quickly "killed" by means of a small nickel and aluminum device clamped around the lead wires, which provides a shunt across them should the lamp burn out. A simple aluminum oxide cutout on one of the lead wire locations will break down should a lamp filament break while unlighted and it will shunt the lead wires when the circuit is again energized. The construction and method of installing this device are shown in one of the illustrations.

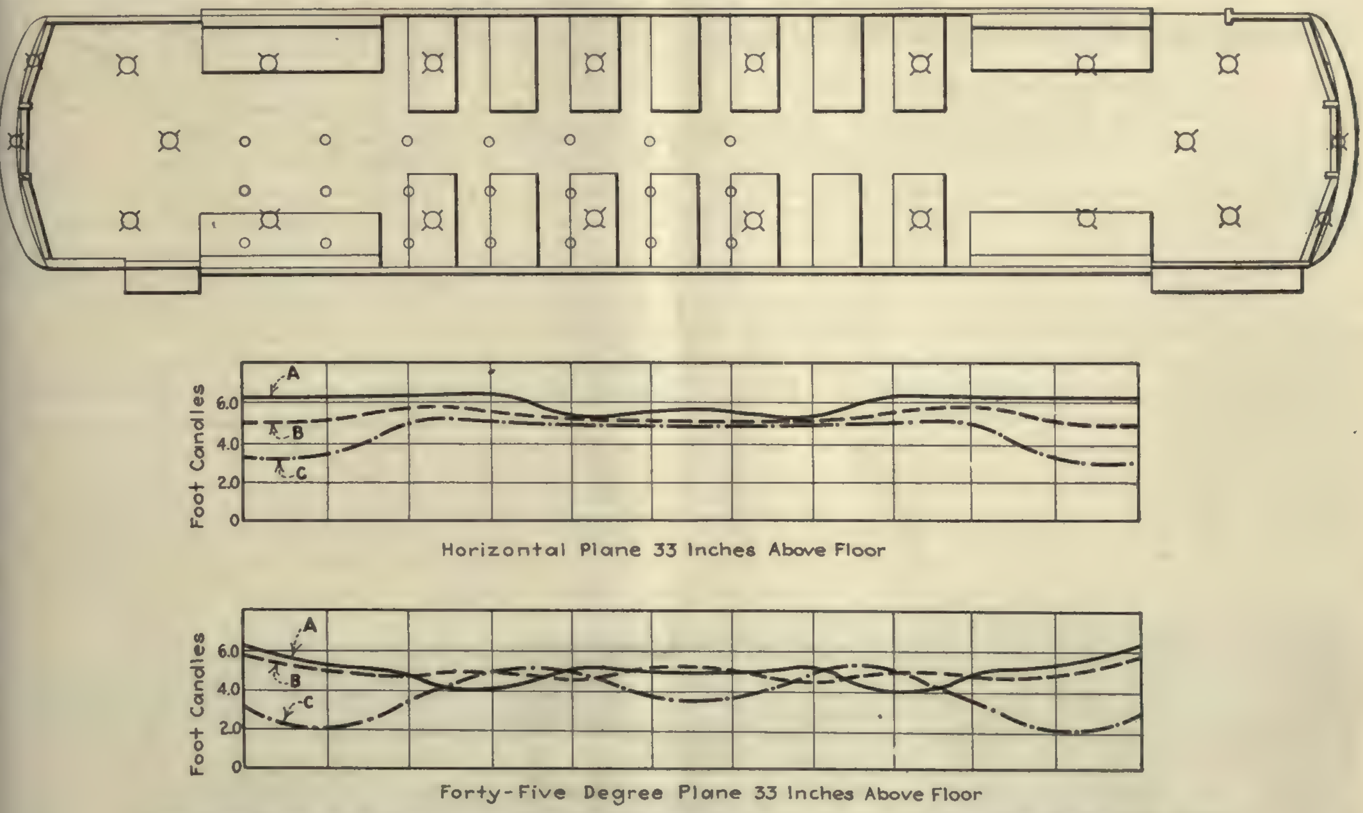
In another diagram is shown the seating arrangement of the cars and also the locations of the lamps. All outlets shown in the seating portion of the car are equipped with Ivanhoe inclosing-type street railway luminaires fitted with short-circuiting sockets which permit the replacing of lamps without disturbing the other lamps in the circuit. The platform outlets are equipped with deep bowl white enameled steel reflectors. These reflectors direct the light toward the steps and also prevent specular reflection from the cab windows reaching the operator's eyes. One lamp is provided in the Hunter sign at each end of the car. Electric Service Supplies Company's No. SR-95 Golden Glow headlights are connected with the rear center platform outlet by means of a throw-over switch, so as to provide for double-end service. Each of these outlets uses a 30-volt, 1-amp., A-19 inside frosted bulb Mazda C lamp and all are connected in a single series circuit across the 600-volt line. Therefore, a string of twenty lamps is used. Had the voltage been 5 per cent more, or 630 volts, 21 lamps would have been installed.

The accompanying graph shows the intensity as well as light distribution secured. These data were obtained by taking illumination measurements at normal reading position (33 in. above the floor) at the locations shown. Since the car interior is of symmetrical design only one-fourth of the car area was considered, this method being accepted as sufficient to provide an average for the entire car. It will be noted

This Picture of the Car Interior Was Taken Entirely by the Light of the New Lamps. Note Absence of Glare



The Film Cutout Short Circuits the Lamp in Case of a Burnout or Break in the Filament



Above, Floor Plan of the Youngstown Car, Showing Locations of Outlets and Positions for Photometric Tests. Below, Light Intensities in Horizontal and 45-Deg. Planes at Reading Height

that the average intensity for the seating portion of the car of 6.0 foot-candles is obtained on the 45-deg. reading plane. Approximately 360 watts are used in this section.

Using for comparison the illumination provided by 36-watt, 120-volt, Mazda B lamps arranged in circuits of five lamps each, 570 watts would be required to provide this same intensity. On the basis of the results with 36-watt, 120-volt Mazda B lamps throughout the car a total of 820 watts would have been required, compared with 600 watts using the cutout lamp.

However, the light efficiency of this gas-filled lamp is but one of its many advantages. For instance, when a lamp burnout occurs, the one lamp only becomes darkened; the remaining nineteen lamps, although connected in the same series circuit, continue to operate. This greatly facilitates replacement of the burned-out lamp. It is unnecessary to check the circuit, as required when using five ordinary lamps in series.

HEAVY FILAMENTS GIVE LONG LIFE

The filament in the Mazda C lamp is approximately 2½ times as large in diameter as that used for the standard 36-watt Mazda B lamps and is about one-fourth as long. It is coiled and supported at three points. These features provide a lamp that not only is highly efficient but extremely rugged. The short life experienced from Mazda B lamps due to filament interlocks is entirely eliminated.

Another advantage experienced by the Pennsylvania-Ohio company is that the problem of lamp theft is practically solved. The new lamp, being designed to operate at 30 volts, will immediately burn out when placed on house lighting circuits.

Many complimentary remarks have been made by the patrons of the Pennsylvania-Ohio company since the cars have been operating. An abundance of light is furnished and at the same time glare is reduced to a minimum. The white ceiling, together with the low brightness of the lighting glassware, has made this possible.

Group Insurance Expanded at Schenectady

CONTINUED co-operation between the management and employees of the Schenectady Railway, Schenectady, N. Y., has resulted in an expansion of the company's group insurance program to include health and non-occupational accident protection and accidental death and dismemberment coverage. Life insurance, in force for about two years, totals approximately $480,000, and is about the same in amount as the accidental death and dismemberment insurance.

The combined insurance plans enable an employee to receive a maximum of $1,000 life insurance and $1,000 accidental death and dismemberment protection. Under the provisions of the health and accident policy, an employee will receive benefits ranging from $10 to $20, according to the size of his weekly salary.

Through the provisions of the accidental death and dismemberment policy, the family of an employee killed in an accident will receive $1,000, in addition to the death benefits established by his life insurance, while if the employee suffers the loss of an eye, limb, or of any two members, he himself will receive a cash payment of either $500 or $1,000, according to the extent of his injury.

The insurance, under both new and original contracts, is being underwritten by the Metropolitan Life Insurance Company and covers about 360 employees of the railway.

Accidents Reduced in St. Louis

Much Credit Is Due to the Activities of the Safety Director—Prizes Offered for Various Safety Contests on the United Railways System

CONTINUED decrease in the number of accidents on the United Railways of St. Louis has resulted from the interest in safety matters created through the work of E. K. Eastham, safety director of that system. For the year 1923 there averaged 2,112 accidents per month. In 1924 this was reduced to an average of 1,781, in 1925 to 1,738 and in 1926 for the first four months to 1,619 per month. The high point of 3,181 car-miles per transportation accident was reached in July of 1925. Practically every month for the last two years has resulted in a higher mileage per transportation accident than the comparative month the year previous.

These results are accomplished in a number of ways; one or two different kinds of contests are always in progress. In the past, contests have been run between the different car stations of the property for the best reduction in automobile collision accidents in which a $100 prize was given. At another time a $100 prize was offered for the best reduction in the total of all accidents and a similar prize in another contest was given to the car station making the best reduction during the year previous of claims arising on which no reports had been filed.

How the Records Are Calculated

Every three months the motormen and conductors producing the best accident records are given a dinner by the company. The comparison on which the best accident record is calculated in this safety dinner contest is based on a number of points. First comes the item of boarding and alighting accidents, the score on this point being determined by the number of passengers carried per accident. The second point is based on all other transportation accidents and is scored by taking the sum of the total mileage plus one-tenth of the passengers carried and dividing this sum by all accidents. The third point is the calculation of per cent of "no reports claimed." Scoring for this point is obtained by dividing the number of no reports claimed by the total of all accidents.

Certain stations operate greater proportional mileage in the congested districts. In order to put these carhouses on a parity with other stations, they are assigned arbitrary handicaps from par or zero to twelve points for those carhouses where the traffic conditions are the worst. The final scoring to determine which carhouse receives the dinner is obtained in the following manner: The stations are first listed in their relative order in regard to the first point named above, boarding and alighting accidents. The station ranking first received 39 points, the station ranking second 36 points and so on down the list, subtracting three each time. The second point above, all other transportation accidents, is listed in the same way—the station at the top receives 26 points and the next station ranking below receives two less points, and so on down the list. Similarly the no report claims are calculated. The station ranking first in this receives thirteen points and each station below in turn receives one less, and so on. These points are then added together with the handicap allowed and the station having the highest number of points receives the dinner.

One of the Thirteen Stations of the United Railways of St. Louis at Which Safety Work Is Being Actively Promoted by the Safety Director. This View Illustrates North Broadway Car Station, Completed Less than Three Years Ago

Beginning with March 1, 1926, another contest was started. The carhouses having the three highest scores for the six months beginning with that date may each elect one trainman to attend the National Safety Congress in Detroit with Mr. Eastham.

In addition to these contests many meetings are held. Safety work is considered to include personnel work as well. There is a safety committee on the property. Every two months two additional men are elected, one motorman and one conductor from each station. Old members do not retire, but stay on the committee. At present this committee numbers about 400, there being about 32 men from each station. Meetings of the safety committee are held once every four or five weeks.

Fatalities in which the United Railways was involved in any way were 31 in 1925. This figure is compared with the lowest record of fatalities occurring in 1920 and 1922 with 25 fatalities and the high point in 1910 of 70 fatalities. The safety director, in further reporting on the activities of his department in 1925, stated that 305 meetings that were directly connected with safety work on the United Railways were held during the year. There were 78 other meetings either of the St. Louis Safety Council or committees of that council. Safety talks to the number of 195 were given by the safety director during the year.

Maintenance Notes

Service Obtained from Trolley Wheels

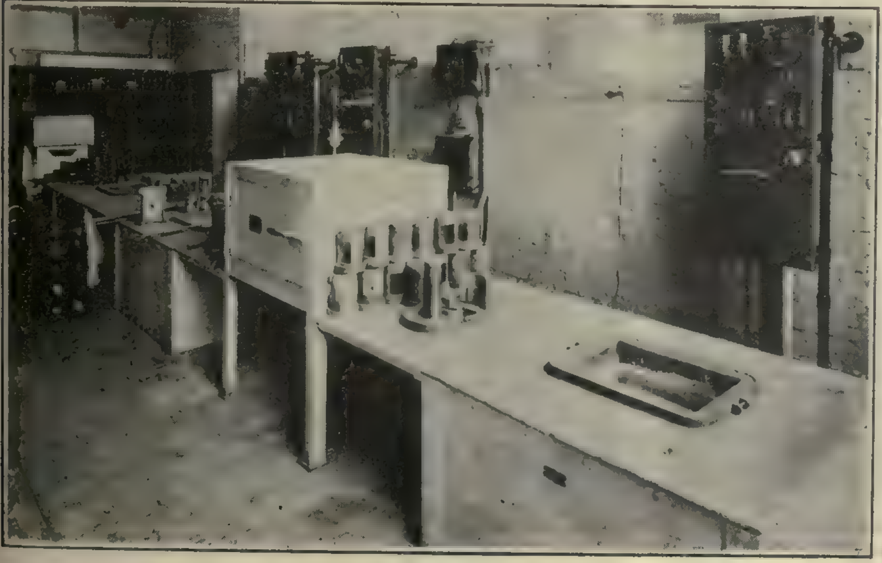
DISCUSSING results obtained with standard makes of trolley wheels, the Electric Railway Association of Equipment Men, Southern Properties, gave some interesting figures at the tenth semi-annual meeting. The Dallas Railway, Dallas, Tex., uses a 6-in. wheel with a 1-in. axle and obtains an average of 3,500 miles per wheel. This company is now testing out trolley shoes and finds that they reduce the number of delays. Cars are equipped with two trolley poles, one of which has a wheel for backing up. The trolley wire is lubricated every three months at a cost of approximately $1 per mile. This company also uses some 4-in. diameter wheels and obtains an average of 8,000 miles.

Of other railways discussing this question, the Chattanooga Traction Company, Chattanooga, Tenn., uses a 4-in. wheel and obtains 1,800 miles. The Mobile Light & Railroad Company, Mobile, Ala., averages 6,000 miles from a 4-in. wheel. The Knoxville Power & Light Company, Knoxville, Tenn., uses a combination of trolley shoe and wheel for backing up, and has had trolley shoes in service now on its interurban lines for two years and found them entirely satisfactory. The company uses 18 to 24 lb. tension at the wire. The Birmingham Electric Company, Birmingham, Ala., uses a 6-in. wheel and obtains 9,000 miles for the wheels and 5,000 from bushings. The Arkansas Central Power Company, Little Rock, Ark., uses 4-in. wheels with ½-in. axles and obtains 9,500 miles. Both the Georgia Railway & Power Company, Atlanta, and the New Orleans Public Service, Inc., New Orleans, La., use 6-in. standard wheels, Atlanta obtaining about 6,000 miles in city service and New Orleans 11,000 miles.

Electrically Heated Babbitt Pots Installed

WHAT is probably the first complete installation by an electric railway of electrically heated babbitting equipment has been made by the Los Angeles Railway, Los Angeles, Cal. This equipment is used for rebabbitting the car journal and armature bearings. The installation consists of three electrically heated and automatically controlled melting pots and a preheating oven, all of General Electric manufacture. In addition, an electrically heated Oakite cleaning tank and various metal-lined bins and benches made in the shops of the company have been installed.

Great effectiveness in the babbitting process is obtained by maintaining a uniform temperature with the thermostatic control. This is set for the correct heat, which is then automatically maintained constant. The Oakite cleaning tank, the melting pots and the preheating oven are arranged in order to obtain the most efficient step-by-step process of production. Methods used in rebabbitting bearings were described in the ELECTRIC RAILWAY JOURNAL for July 26, 1926.



New Bearing Section of the Los Angeles Railway Shops

Old Passenger Cars Converted to Sand Cars

HAVING a number of old passenger cars which had fulfilled their period of usefulness as such, the Portland Railroad, Portland, Me., converted several of them for duty as sand cars. In this capacity they serve two functions, the first being to operate as track sanders in periods of inclement weather, while the other is in their use as sand reservoirs while in the shops. Small sand gates located in the sides of each unit are shown.

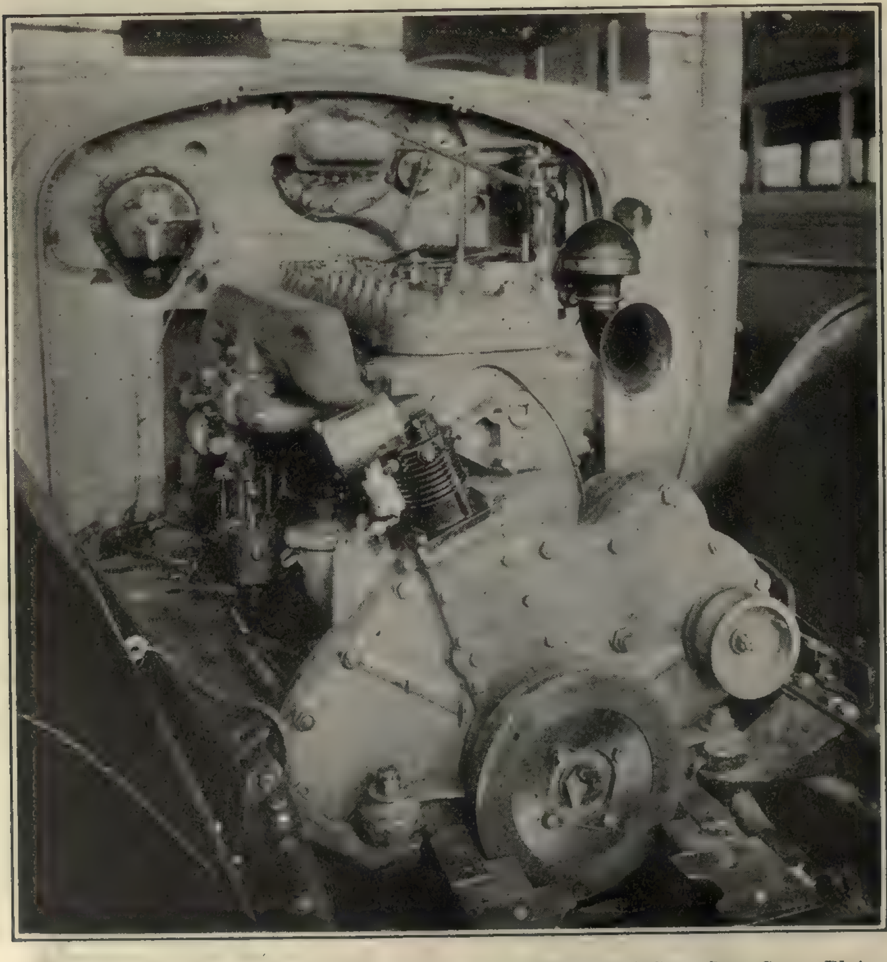
Filling a Pail from the Gate in the Side of a Rebuilt Sand Car

Large bins constructed in each of the sand cars contain 5 cu.yd. of sand when filled to capacity. All of the fittings, such as seats, heaters, etc., were removed from the interiors of the cars when the bins were added. No further changes were necessary, other than to provide the necessary sand feeders for covering the rails and inserting the sand gates.

New Equipment Available

Front-End-Mounted Compressor

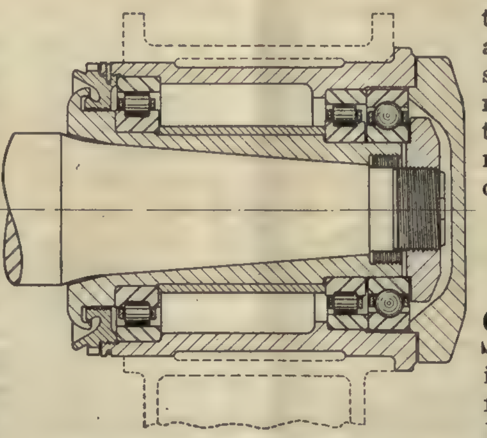
FOR the purpose of getting away from troubles caused by undue strain upon timing gears, chains, belts or universal joints, the Christensen Air Brake Company, Cleveland, Ohio, has worked out a compressor for mounting on the front-end gear case cover plate of the vehicle engine. This is driven directly from an eccentric on the main crankshaft. This makes it practically an integral part of the engine and, besides, a very simple construction and drive. This type of mounting for the compressor has been incorporated in several different makes of buses. The one shown in the illustration is on the front-end gear case cover plate of a Continental Model 14H engine installed in a six-wheel bus for the Cleveland Railway.



Christensen Compressor and Governor Mounted on Front-End Gear Case Cover Plate of Continental Model 14H Engine Installed in Six-Wheel Bus in Service on the Cleveland Railway

Improved Roller Bearing Mounting

BOTH radial and thrust loads are cared for in a combined roller and ball bearing designed particularly for electric railway use, which has been announced by the Norma-Hoffman Bearings Corporation, Stamford, Conn. The radial loads are carried on roller bearings and the thrust loads on ball bearings, all being mounted on a tapered sleeve. The ball bearings are thus relieved of all radial loading as they do not have contact around the outer periphery. The accompanying drawing shows the construction used in this new design of axle box mounting for electric cars.

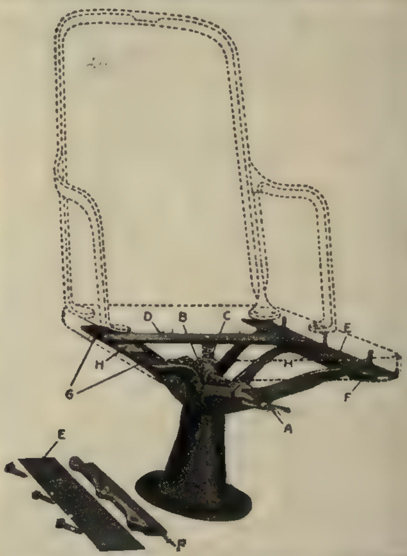


Combined Roller and Ball Bearing Designed for the Axle Boxes of Electric Cars

Advantages claimed by the manufacturer include a reduction in tractive resistance, quicker acceleration and easy dismantling without destroying the original fit of the inner rings on the sleeves. Adequate protection is provided against dirt and moisture and ample space for lubricants.

Adjustable Seats for Bus Drivers

SEATS of the adjustable type for bus drivers have been developed in two styles by the Eberhard Manufacturing Company, Cleveland, Ohio. In one of these styles the seat is provided complete with pedestal. In the other style the seat is designed to be mounted directly on the battery box in such a way that the box cover and the seat can be tilted to inspect the battery.



Adjustable Seat with Pedestal. The Seat for Mounting on Battery Box Is Similar in Style

It is possible for the driver to move the seat backward or forward to suit his own comfort merely by turning the thumb screw *A*, which is shown in the accompanying illustration. It is unnecessary for the driver to leave the seat in making this adjustment. The screw which moves the seat into the desired position also locks it in place. Flat springs are so arranged that the operating mechanism cannot rattle under road shocks. Both of these types of seats will be on exhibition at the A.E.R.A. convention in Cleveland.

Powerful Snow Fighter and Dumper Designed

DRIVEN by a 100-hp., six-cylinder engine the new snow-fighter and dumper now offered by the Walter Motor Truck Company, Inc., Long Island City, N. Y., has tremendous pushing power. A special transmission is provided with five forward speeds so as to give a range of ten to one.

The front plow is a new patented type designed to throw the snow well off the road. This is of particular value in steam-electric railway tracks. The plow can be swung to either side to take advantage of traffic or drift conditions. A center scraper is spring mounted so it can scrape right down to the road surface.

Improved Bus Construction Provides Folding Seats Across the Rear and a Combination Guide Rail and Luggage Loft

Combination Guide Rail and Luggage Loft

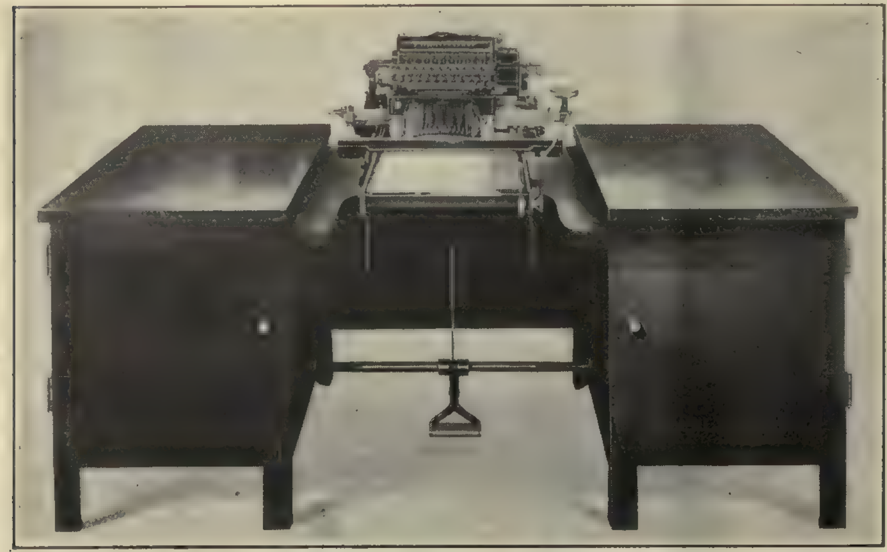
BAGGAGE racks of an unusual type have been incorporated in a recent de luxe city type bus body built by the Baker-Raulang Company, Cleveland, Ohio. A lined compartment extends along each side of the bus. It provides sufficient capacity to care for the hand luggage of the passengers. At the edge is a guide rail finished in a natural wood, which serves to steady passengers in going to and from their seats and for the support of standing passengers. This type of construction lends a pleasing appearance to the de luxe model bus, which has leather-covered seats.

Another feature of the Baker-Raulang design is the use of five individual folding seats across the rear of the bus.

Two Heavy Capacity Cranes

SIMILAR in many respects to the 5-ton size of crane but of a capacity of 6 and 7½ tons respectively, two new units have just been brought out by the Universal Crane Company, Cleveland, Ohio. The 6 and 7½-ton units are rated at 12,000 and 15,000 lb. respectively at 10 ft. radius. Their development is the outgrowth of a demand for the mobility, adaptability and all around speed of this type of unit. The appearance and size of the new units are the same as for the present 5-ton crane. They are full revolving with a swing speed of 6 r.p.m. The rope speed is 140 ft. per minute. The units are gasoline-powered with a 44-hp. Waukesha motor and are one-man operated, only three levers and one pedal being used to control various swinging and bucket operations.

For Placing Rails in Position After They are Unloaded at the Side of the Street the New Cranes Are Found of Particular Convenience



Accounting Machine Embodying the Flat Writing Principle

Time Saved by Electric Accounting Machine

EASE of operation features a new electric accounting machine just announced by the Elliott-Fisher Company, Harrisburg, Pa. This machine relieves the operator of every effort except the manipulation of the keyboard. The flexibility of the machine makes it readily applicable to existing systems and any type of accounting routine may be effectively placed under mechanical operation. With an accounts payable system with columnar distribution all amounts are added simultaneously, sums computed and proved. The electric motor handles all movements of the machine hitherto accomplished by manual effort.

Braking Blocks for Automotive Equipment

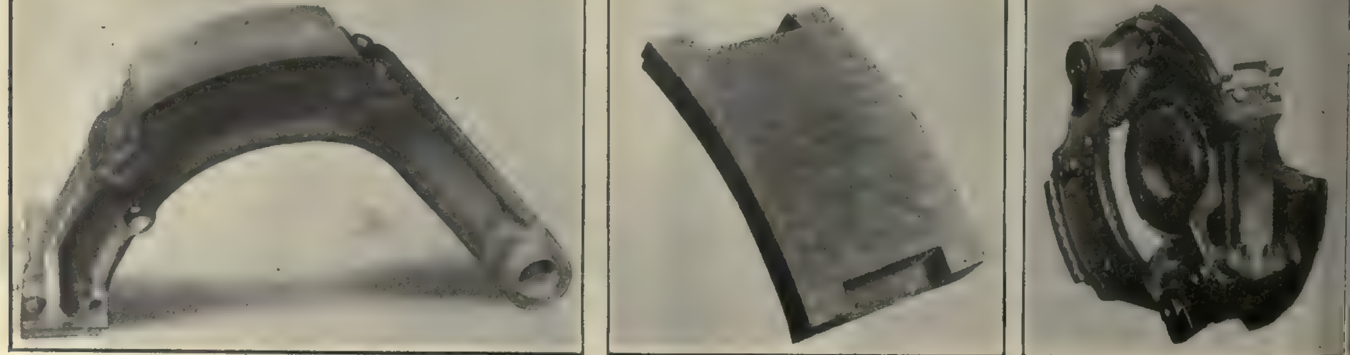
TWO influences are at work to improve the braking methods used on heavy motor vehicles. One is the growing size and weight of these vehicles. Operators are realizing that the methods suitable for lighter cars are not necessarily the best when the weights to be controlled reach 10,000 lb. or more. This is shown by the growing use of power brakes on heavy buses and trucks. The other influence tending toward more scientific braking is the entry into the automotive operating field of many steam and electric railroads which are accustomed to the use of standardized brake rigging on heavy high-speed cars and want the same definiteness and efficiency of brake equipment on the heavy auto vehicles they are placing in service.

With these thoughts in mind the American Brake Shoe & Foundry Company has been at work for some time past on the development of brake materials and their method of application to auto buses and trucks and have placed on this problem the expert knowledge gained by the company in 25 years of experience in the stopping of railroad trains, both steam and electric. Accompanying this development has been a series of extended tests, both on the brake materials testing machine of the company at Mahwah, N. J., and in actual practice on a 16,500-lb. truck. The development work is finished and the company is now putting on the market, through a subsidiary, the American Brake Materials Corporation, a form of brake block and method of its attachment for which notable advantages are claimed over the customary brake band or liner in which some kind of fabric is used as a basis.

With this latter type of brake, the customary method of varying the brake effect has been to increase the area of the brake band or liner so that now on a drum surface of 57 in. in periphery (or 18 in. in diameter) a length of 36 in. for the brake lining is not uncommon on heavy buses and trucks. With this size of brake liner the length of free radiating surface of the drum itself would be 21 in. or the difference between the periphery of the drum, 57 in., and the length of the liner, or 36 in. With the new brake material of the American Brake Materials Corporation two brake blocks, each of only 6 in. length in braking surface, are used, giving 45 in. of drum surface during each revolution for the dissipation of heat.

The brake blocks of the American Brake Materials Corporation are of a dense compressed material which has no metallic content and is unaffected by oil, grease or water. This brake material is compressed under very high pressure into a steel back or shell, which is attached to the brake arm by bolted keepers. These bolts are set radially to the drum, while the bevels on the sides of the keepers are parallel to each other. This prevents the block from becoming dislodged in the remote case that the lock nuts on the bolts should become loose and drop off. At the same time the method of mounting allows the blocks easily to be replaced when they become worn. During such replacement the supporting arm does not have to be removed.

Great stress is laid by the manufacturers on the simplicity of this method of attachment as compared

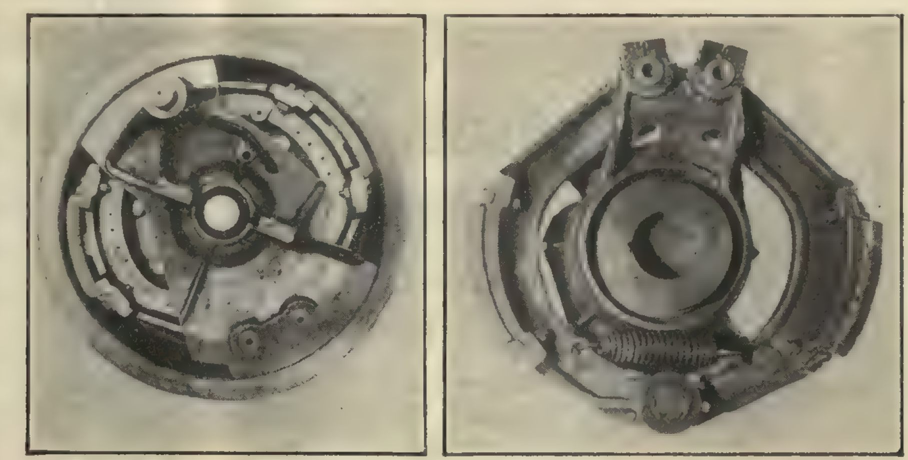


At Left, Brake Block on Arm. In Center, Brake Block by Itself. At Right, Spider with Arms and Blocks in Place with the rivets employed with the usual brake band or liner. They also emphasize the desirability of a brake material incompressible under the pressures used in service as compared with a fabric liner, which is not only compressible but whose braking effort varies with use. With a constant brake effort it is possible for automotive engineers to establish a suitable foundation for the brake rigging.

The manufacturers have standardized the shape of the brake blocks described so far as it has been possible to go at present, following in this matter their pioneer work in standardizing the shapes of brake shoes for electric railways. In other words, all blocks for trucks and buses weighing more than 10,000 lb. will have a definite length, width, thickness and back radius, as well as a standard keeper. The only dimension which it has been impossible to standardize is the radius of the wearing surface of the block, which necessarily has to vary with the diameter of the drum. This modification in the shape of the brake block is obtained during manufacture by changing the male die used to form the surface.

Briefly the advantages claimed for the new brake block follow:

1. Friction equal to any in fabric liners, and this friction remains constant throughout the entire life.
2. Smaller contact area needed, leaving greater drum surface to dissipate heat.
3. Durability so far in excess of fabric liners that brake wear becomes an unimportant factor.
4. No metallic contact whatsoever. Drums will not be scored or cut.
5. Can be attached or detached readily by unskilled labor, without removing brake block from the brake arm.
6. No riveting required—attached to the shoe with solid bolts.
7. Absolutely unaffected by water, oil or grease.
8. Cannot burn, smoke or squeal. Will not grab.



At Left, Spider with Arms and Blocks Within Brake Drum. At Right, Spider Alone

As already explained, the brake blocks mentioned were thoroughly tested by the manufacturers before being placed on the market. The testing machine at the Mahwah works of the American Brake Shoe & Foundry Company, on which one series of tests was conducted, is illustrated. It is the same machine used to test railway shoes and is capable of duplicating service conditions up to 80 m.p.h. and brake block pressures of 20,000 lb.

The other test, which extended over three months, was with a motor bus weighing 16,500 lb., which was run in neutral down a continuous 10 per cent grade for 2½ miles on Mount Tuscarora, near Chambersburg, Pa. On each run there was but one application of the brakes at not more than 12 lb., the pressure being by power and decreased only at times to allow the bus to maintain uniform speed. The run took about ten minutes.

The bus was fitted with 32 thermocouples read through potentiometers. These couples recorded the heat generated by friction and were placed at all points where it was thought heat measurements of this kind were desirable. Readings were taken at the top and foot of the grade.

The results are now being tabulated and will undoubtedly prove very instructive on the subject of the heat generated by brake friction of descending vehicles. They are to be made public by the manufacturers after being compiled. It is sufficient to say here that they indicated satisfactory results so far as the brake efficiency of the blocks was concerned, and that braking was accomplished without undue heating, without the production of smoke, odor or squeal and without appreciable deterioration of the brake material in the blocks, or excessive wear on the brake surface of the drum.

For outside brakes, a similar arrangement of blocks, but concave, will be used. The brake block can be applied to any brake arrangement, hand, foot or power.

At Left, Brake Shoe Testing Machine at Mahwah, N. J. At Right, Interior of Test Bus

In the right-hand view the two indicators at the extreme right show diaphragm pressure and travel. The third gage at the right shows the reservoir pressure. Time is also shown.

At the left, in the view of the interior of the test bus, is a record chart which shows time, revolutions of front wheel, distance run and brake application.

Association News & Discussions

Bus Competition to Tramways in Great Britain

Municipal Managers Greatly Exercised Over Inroads on Their Traffic by Independents Operating Unregulated Bus Lines

LOSS of traffic by established electric railway companies to independent, unregulated and almost tax-free bus lines prevails in England and Scotland as it does in America. Indeed, comments on the situation contained in a number of papers by municipal tramway managers, presented at the annual meeting of the Municipal Tramways Association at Liverpool Sept. 8-10, indicate the condition to be even more acute there than in this country, even though a very large number of the tramway systems in the large cities in Great Britain are municipally owned. Even in Glasgow, where in 1924 the only buses were a very few which brought passengers into the city from places far beyond the tramway termini, the streets are now almost overrun with them, and they are seriously cutting into the traffic of the tramways.

Bailie Robert Laing, convener of the Glasgow Tramways Committee, estimated the present number of independent buses in Glasgow at 600. Most of them, he said, are owned in districts outside the city and pay very little in the way of taxes for their use of city streets, adding: "They are wearing the surface of our roads and streets; they are causing congestion; they are taking up a large part of the time and attention of the police force; they are maiming and killing our citizens, and, apparently, there is no redress." All main roads leading to the city now have both tramway service (provided by the municipality) and motor bus service (provided by independents).

Some of these motor buses are legally known as "coaches," which means they require no license, but cannot pick up and set down passengers within 5 miles of the general post office. Little attention is paid by them to the law on this subject, according to the speaker. Recently a number of the bus owners have been taking out licenses for "carriages," which allows them to do a local business and gives them a "stand" within the city. To compete with this motor bus service the speaker believed the tramcars would have to increase their speed to 20 m.p.h. or more and use more modern equipment, while the cities should try to secure more stringent requirements for motor bus operators.

Other papers somewhat along the same lines were presented by the deputy chairman of the Salford City Tramways Committee and the general manager of Birmingham Corporation Tramways. The former strongly advocated the establishment by Parliament of transport commissioners to correlate local transportation services, whether municipal or privately owned, together with local area transport boards, which would initiate or authorize new lines and otherwise have somewhat similar powers to public utility commissions in this country, except that they would have equal control over municipal and private undertakings. Appeals from their decisions could be taken to the national commission. Such boards, said the speaker, would be a great help to many municipal tramway authorities who are intimidated by political influence from establishing an economic tramway fare. An interesting point brought out in this paper was that during the recent general strike in Great Britain, when no tramcars ran, the highway congestion was greater than ever and in some cases, in Manchester, the streets became well-nigh impassable.

Besides the governing boards suggested, the speaker urged greater attention to proper street car design, particularly in the way of the development of smaller modern lightweight cars and automatic equipment for speeding up the loading and unloading of passengers.

COMING MEETINGS
OF
Electric Railway and Allied Associations

Oct. 4-8—**American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.**

Oct. 10-15—**Congress International Tramway, Local Railway and Motorbus Association, Barcelona, Spain.**

Oct. 11-13—American Management Association, annual convention, Hotel Statler, Cleveland, Ohio.

Oct. 25-29—**Annual Congress and Exhibit, National Safety Council, Book-Cadillac Hotel, Detroit, Mich.**

Nov. 5—**American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p. m.**

Nov. 16-18—**Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.**

Nov. 16-19—**American Welding Society, fall meeting and International Welding and Cutting Exposition, Buffalo, New York.**

The paper from Mr. Baker of Birmingham urged the same obligation on private bus operators with regard to fares, services and cheap fares for working classes that are imposed on municipal tramway undertakings. Birmingham has some municipal bus service, its latest orders being for a six-wheeled double-decker with covered top, the seating capacity being 66.

COUNCIL REPORT

The report of the Council (executive committee of the association) referred to the effort of the association to have Parliament correct the condition by which those municipalities that wish to operate motor buses are subject to the maximum of cost and delay, while private interests can secure these rights at practically no cost. A bill to secure such a change was introduced in Parliament, but was defeated by 133 to 128 votes, largely on the ground that it was a direct attack on private enterprise and an extension of municipal trading. The effort to secure a satisfactory change in the law will be renewed.

The general strike, which lasted from May 3 to May 12, affected every member of the association except Ayr. In many districts the harmony between employers and employed was quickly destroyed. On June 11 the Council decided that the national agreement was suspended, but recommended (1) that the provisions of the agreement should be followed and especially that no concessions should be granted beyond those contained in it; (2) that the clauses in the agreement relating to the schedule of weekly duty being not less than 44 hours and the guaranteed 48-hour week should be definitely suspended until the labor trouble had been cleared up and a further recommendation made, and (3) the break in service caused by the strike should not be considered as a break in service for the purpose of granting holidays.

The tax authorities have agreed that the annual allowance of 20 per cent on the written-down value for wear and tear of motor buses may be continued for a further period of five years, ending with 1929-30, and that the annual rate of depreciation on trackless trolleys may be taken as 15 per cent, with the statutory allowance for obsolescence of the unliquidated amount of capital expenditure (less scrap value) when the vehicle is disposed of. This proposal has been agreed to by the Council.

An essay composition was instituted in 1926 to cover the following three subjects: (1) Finance, (2) traffic and (3) engineering. Forty-eight essays were submitted.

The Minister of Transport has issued an official notice that one-man front entrance and exit cars will be distinguished by red lettering "Front Entrance Car" and warning drivers of other vehicles about passing between such a car and the curb while the cars are receiving and discharging passengers. An effort to penalize automobile drivers who attempt to do so was defeated in the House of Lords on July 7, 1926.

PRIVATE RAILWAYS ALSO SUFFER

There are 242 tramway undertakings in Great Britain and of this number 170, with 1,859 miles of route, are owned by municipalities, while 72, with 746 miles of route, are owned by companies. The latter have suffered about as much as the municipal lines from unregulated bus competition, according to a paper at the last meeting of the Tramways and Light Railways Association. One remedy suggested by the speaker there was to require the buses to charge a fare somewhat higher than that on the street cars where their routes were parallel.

Colorado Association Discusses Railway Problems

PROBABLY no other industry has had to contend with so many changes in recent years as has the electric street railway, according to S. B. Irelan, vice-president and general manager of the St. Joseph Light, Heat & Power Company, St. Joseph, Mo. This statement is contained in an address on "Electric Street Railway Situation of To-Day," delivered at a convention of the Colorado Public Service Association at Glenwood Springs on Sept. 15. The changes enumerated by Mr. Irelan included the following: Overcoming the increased cost of labor and materials used in railway operation, brought about during the war; changes in contractual relations as to its rates of fare, which in most instances have been made on the old basis of cost, and serious inroads on the volume of its business, due to the development of the automobile and competition of the privately owned car and motor bus. Nevertheless, according to Mr. Irelan, no American city of any size up to date has been successful in substituting some other means of transportation.

In the smaller cities the number of passengers carried has decreased in the five-year period from 20 per cent to as high, in some instances, as 50 per cent. The patrons today are the thrifty and the less well-to-do people of the community, who either cannot afford their own private conveyances or see the fallacy in the economics of operating a private automobile for transportation, as compared to street railway transportation. Authorities should recognize the need of the service to these people and assent to higher fares where necessary, but particularly to the reduction or abolition of the unusual tax burdens and other assessments carried by the average street railway. These include paving taxes, franchise taxes and cost of sprinkling streets, snow removal, and construction and maintenance of bridges and viaducts.

More than 10 per cent of the gross earnings of the average street railway, according to the speaker, is required to pay these taxes and special assessments. He also recommended laws to limit parking on congested streets.

In conclusion, the speaker declared that the individual company is negligent which does not adopt economies in operation, improve its service and engage in a program to eliminate special assessments and unusual burdens. These results can be best be secured, he said, by educating the public to recognize the fairness and justice of the railway demands.

Railway Electrification at World Power Conference

RAILWAY electrification was a leading subject discussed at the sectional meeting of the World Power Conference recently held at Basle, Switzerland, on which reports were presented from most European countries, the United States and Japan.

William S. Murray, consulting engineer of New York, who represented this country, took a broad view of the situation. His main contention was that the use of electrical enery for railway operation has fallen far behind the use made of it for other purposes. The revolution of the transportation system has not kept pace with industrial production. About 80 per cent of the electrical energy produced in America is absorbed by industry, the railway demand being exceedingly small in comparison.

The need of the times, Mr. Murray insisted, is the acceptance of a standard type of power for railroads in place of the variety of systems now existing. What has been done hitherto is a mere experiment, as upon the electrified lines of the United States only 5 per cent of the total traffic tonnage is carried. Two opinions expressed in the paper were that in future the standard system of railway operation should be high-voltage direct current and that the railroad companies should procure power from public sources.

Colonel E. O'Brien, the reporter for Great Britain, dealt with the broad economic aspects of railway electrification. His report stated that even in countries where coal was cheap electrification could effect economies in cost of locomotive operation and maintenance of from 10 to 25 per cent and that a 50 per cent increase of speed could be effected without proportionate increase in cost. Other economic advantages referred to were reduction in cost of track and depot maintenance, generally improved conditions of operation and supplies of cheap energy for light and power. An important problem which has not yet been solved in England, Colonel O'Brien said, is whether the electric locomotive requires one or two men to operate it, and he thought that if this question could be satisfactorily settled railway electrification would receive a great stimulus.

Other reports described some existing installations, including those on the French, Dutch, German, Swiss and Swedish railways. The report on the electrification of the Stockholm-Gothenburg section of the Swedish State Railways was particularly interesting.

American Management Association Annual Convention Oct. 11-13

CLEVELAND will not be through with conventions when the A.E.R.A. delegation leaves. The American Management Association will hold its annual convention at the Hotel Statler on Oct. 11, 12 and 13. The sessions will be divided so as to include a comprehensive program of the subjects under the following heads: Trends in methods of distribution, budgeting technique, management organization, personnel administration and office management.

Particularly interesting to members of the association will be the discussion following the presentation of papers on a budget system—how to install and administer it—led by Prof. John MacDonald of New York University, who has made a very exhaustive research in this field. H. A. Fountain, treasurer Ohio Public Service Company, has also been active on the committee preparing information on this subject. Management's contribution to national welfare, another phase, will be presented in "Pre-Retirement Disposition of Older Employees," a contribution by Bennet F. Schauffler, employment manager Philadelphia Rapid Transit Company.

For further details and program, the secretary of the American Management Association may be addressed at 20 Vesey Street, New York City.

American Society of Civil Engineers Meets Oct. 4-9

BECAUSE of the presence of representatives of many foreign countries the 56th annual convention of the American Society of Civil Engineers will have an international character. The meeting will be held at Philadelphia during the Sesqui-Centennial Exposition. The program will be one of the most unusual that has been presented in the society's 74 years of existence. Philadelphia engineers who will be hosts of the occasion will help to make the entertainment of the visitors thoroughly enjoyable by visits to the many points of historical interest located in and around Philadelphia.

Gifford Pinchot, Governor of Pennsylvania, will deliver the opening address, to which a response will be made by Sir William Henry Ellis, president of the Institution of Civil Engineers, London, representing delegates of other nations. Discussion of transportation problems will have a place on the program. Of special interest to electric railway and bus men will be the following: Comparative lectures on the "History of Development of Road Building" in France and the United States by Thomas H. MacDonald, Chief Bureau of Public Roads, U. S. Department of Agriculture, Washington, D. C., and M. P. Le Gavrian, chief engineer of bridges and highways, Paris, France. Another phase of transportation will be the paper "Fifty Years Progress in

Bridge Building with Special Reference to the Delaware River Bridge," by Ralph Modjeski, chief engineer Delaware River Bridge Joint Commission and consulting engineer, New York.

City planning will be discussed in prepared papers by Harold M. Lewis, executive engineer, Regional Plan of New York and Its Environs, and by John Ihlder, manager, civic development department, Chamber of Commerce of the United States. Other well-known engineers will discuss this subject in five-minute talks.

All members of the society, especially student members, are urged to attend and participate in all the events of the convention.

Will Tell How the Bus Fares in Railway Company

MEMBERS of the American Electric Railway Association have been specially invited to attend the Cleveland Section meeting and dinner of the Society of Automotive Engineers at the Hotel Cleveland, Monday, Oct. 4. A dinner will be served at 6:30 p.m. The meeting proper begins at 8 p.m., at which C. M. Ballou, Street Railway Commissioner of Cleveland, will tell of the public reception of bus service in that city. Walter Jackson, consulting engineer, will address the meeting on the subject "How Fares the Bus in Electric Railway Company."

American Association News

Ample Arrangements for Validating Tickets

W. J. KENNEDY, manager of the Cleveland Chamber of Commerce has concluded arrangements with passenger departments of steam railroads entering Cleveland to maintain at Public Auditorium Oct. 5 to 8, inclusive, a railway information bureau at which delegates and visitors may have their railroad tickets validated for their return journey. At this bureau two railway representatives will be in attendance continuously on Tuesday, Wednesday, Thursday and Friday, 9 a.m. to 5 p.m. In addition, these representatives will furnish information regarding train service out of Cleveland and, up to Friday noon, Oct. 8, will also accept Pullman reservation orders.

In accepting orders for Pullman space these representatives will use a special form which will pass from the railway bureau to the city offices of the several railroads, officials of which will indicate thereon the particular space assigned to the applicant. Then the forms will be dispatched by messenger and placed in the room box of the applicant at his hotel, except that any applicants who may be housed in hotels east of East Fourteenth Street will call at the railway validating office at the auditorium for their particular advice. The applicant will then call at the proper ticket office to purchase his Pullman ticket or advise the hotel porter to pick up the Pullman ticket.

The convention board will supply the messengers to make this service effective. There will be no charge to the visitor for the service rendered at the Public Auditorium.

Monday Morning Session Advanced

CITY MANAGER HOPKINS of Cleveland, Ohio, will open the 45th annual convention of the A.E.R.A. with an address of welcome.

It has been decided to hold this meeting in the ballroom of the auditorium instead of the meeting room in the west wing. Also, the time of the meeting has been advanced from 9:45 a.m. to 9:30 a.m.

The Pittsburgh Railways' band, consisting of 40 pieces, will furnish the music for this meeting and also for the public inspection of the convention exhibits on Wednesday evening.

Tuesday Night Speaker

HON. W. IRVING GLOVER, Second Assistant Postmaster-General, in charge of the air mail service, has been chosen as the principal speaker at the Tuesday night, Oct. 5, session of the American Electric Railway Association.

Mr. Glover's subject will be "Civilization's Progress Parallels Transportation Development."

Lord Ashfield Prepares Address for Convention

LORD ASHFIELD, general manager of the London Underground group of rapid transit lines, tramways and motor bus services, has prepared an address which will be presented before the meeting of the American Association on Thursday morning, Oct. 7. His address is a very scholarly paper on the history, theory and principle of co-ordination as distinguished from other economic practices.

Open-Air Truck Exhibit Space Fills Long Needed Want

NEVER before has a convention of the American Electric Railway Association had such an ideal layout for the display of electric cars as is provided at Cleveland. A space between the Public Auditorium and Exhibition Hall which is in the newly constructed West Wing has been provided with tracks for the open air exhibits. Heavy equipment can be run in on its own wheels from a track connection made to the Cleveland Railway tracks.

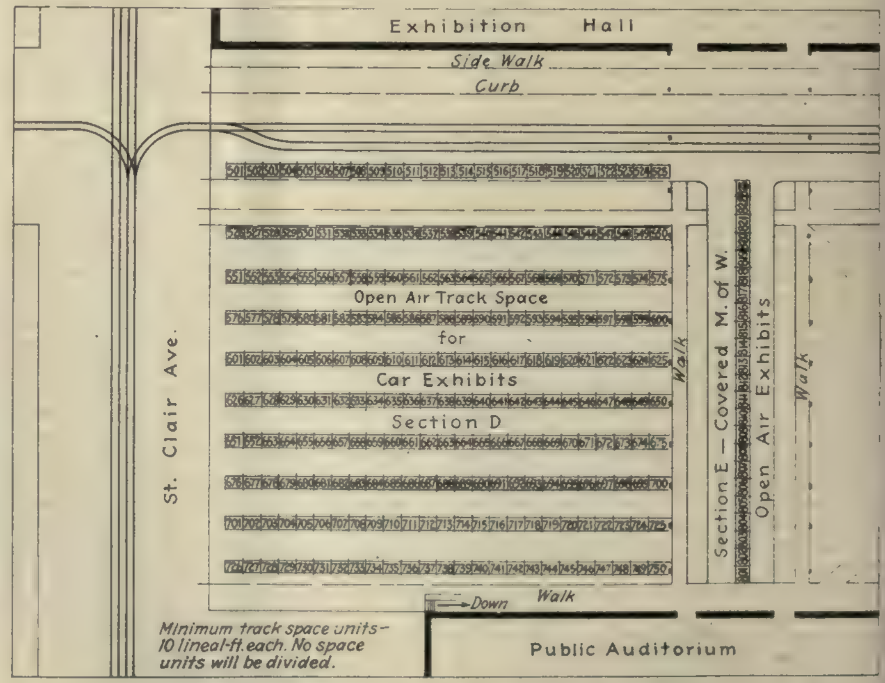
Electric railways and car builders have responded to the opportunity to display cars to an extent never realized before. Seven electric railways and eleven car builders will show the latest types of rolling stock developed. At this time, when such great stress is being placed on the need for modernizing cars, these exhibits will provide an excellent opportunity to gain first hand information on the latest improvements. The railways and car builders who have already taken open air space include:

Electric Railways

Beaver Valley Traction Company.
Chicago, North Shore & Milwaukee Railroad.
Cleveland Railway.
Northern Ohio Power & Light Company.
Pittsburgh Railways.
Tennessee Electric Power Company.
United Railways & Electric Company of Baltimore.

Car Builders

American Car & Foundry Company.
Atlas Car & Manufacturing Company.
The J. G. Brill Company.
Cincinnati Car Company.
Cummings Car & Coach Company.
Differential Steel Car Company.
Light Weight Noiseless Electric Street Car Company.
Phoenix Ice Machine Company.
St. Louis Car Company.
Perley A. Thomas Car Works.
Universal Crane Company.



Seven Electric Railways and Eleven Car Builders Will Exhibit Rolling Stock on These Tracks

The News of the Industry

Kansas City Franchise Extended

Twelve Years Added to Present Grant There to Permit Successor Company to Function

An ordinance was passed by the City Council of Kansas City, Mo., on Monday night, Sept. 27, granting a twelve-year extension to the present franchise of the Kansas City Railways. The franchise now becomes a 30-year grant. The purpose of the extension was to enable the new owner, the Kansas City Public Service Company, to refinance the property and sell long-time instead of short-time bonds. William G. Woolfolk, president of the proposed successor company, had urged an extension of the franchise as a necessary basis to insure sound initial financing.

In return for the extension of the grant the company has agreed to make a slight reduction in fares fixed in the measure at fifteen tickets for $1, making a fare of 6⅔ cents. This is a saving of ⅓ of a cent on each fare, or about 5 per cent of the 7-cent fares. About 12½ per cent of the revenue passengers ride on the 7-cent fare. This means a saving of about $48,000 annually to them alone. The extension ordinance also provides that the city may require the tickets for the reduced fares to be put on sale at such places and in such manner as future ordinances may designate.

Additional Securities Must Be Sold

In a recent letter to the Mayor, city manager and members of the Council Mr. Woolfolk outlined a program of service betterment to be started as soon as the new company obtains actual control of the property, probably some time in October. On the improvement program outlines, Mr. Woolfolk committed his associates "without reservation." The program includes the following:

To rebuild the Mill Creek trestle, which crosses Mill Creek Boulevard and is used by the company to provide freight service for the Westport district of Kansas City, Mo. The present trestle is of wood and provides only a narrow passage for automobile traffic.

To restore street cars to Argentine via the Twelfth Street bridge.

To restore street car service to the central industrial district.

To put all street paving between the car tracks in first-class condition.

To rebuild all defective and worn out tracks with modern construction.

To improve and expand bus service.

To start bus service between Kansas City, Mo., and Kansas City, Kan., across the intercity viaduct.

To modernize all rolling stock.

The cost of this work is estimated at $6,600,000.

Although the new company will have at its command all the money turned over to it by the receivers, after all debts are paid, nevertheless this sum will be entirely inadequate for the extensive reconstruction program now outlined.

The vote in the Council on Sept. 27 was five to three, one Councilman being absent.

Francis M. Wilson, one of the receivers for the Kansas City Railways, Kansas City, Mo., on Sept. 22 declined with thanks the post offered him as vice-president in charge of public relations of the Kansas City Public Service Company, the proposed successor to the Kansas City Railways. The post, together with a voting trusteeship in the company, was offered Senator Wilson by William G. Woolfolk, president of the new company, who expressed deep regret at the Senator's unwillingness to accept the public relations post. No plans have been made for the selection of another man.

In his letter declining the offer, Senator Wilson gave expression to his desire to retire permanently from his connection with the local railways, with which he had served admirably as a receiver for more than six years. It is reported that he will resume his law practice, and rumor has it that he will again place his hat in the political ring, this time as a candidate for the Democratic nomination for Governor of Missouri in 1928.

There are to be five of the voting trustees, who will direct the operation of the new company for the stockholders during the readjustment period following the close of the present receivership. The four so far named are Melvin A. Traylor, J. K. Newman, George W. Davison and Powell C. Groner.

Wage Increase on Eastern Massachusetts

Arbitration Board Rejects Men's Plea for 12½ per Cent Increase, but Saddles Company with $200,000 Additional Wage Expense Each Year

BY A MAJORITY report the special board of arbitration has increased the basic wage on the Eastern Massachusetts Street Railway system 1½ cents an hour and has reduced the working day to eight hours. The men's request for a 12½ per cent increase in wages was rejected on the ground that the board did not deem it warranted by the evidence introduced. What the board gave the men amounts to 67½ cents an hour for operators of one-man cars, who constitute more than 90 per cent of the employees, and 61½ cents an hour for the men on the two-man cars.

The extra cost of the award is estimated at $200,000 a year, with $50,000 back pay. To meet this the company has decided to increase its ticket fares, beginning Oct. 1. Cash fares will remain at 10 cents, but one coupon will be cut from each strip ticket. The company has fifteen operating districts and is selling strip tickets at different rates, according to the density of traffic, the range being from twelve tickets for $1 to nineteen tickets for $1. The twelve-ride ticket will be reduced to eleven for $1, and the nineteen-ride ticket will be reduced to eighteen rides.

The award is made retroactive to May 1. It will run only until May 1, 1927. The eight-hour day also is made retroactive, so that the men will be paid extra for time worked in excess of eight hours since last May.

The finding is signed by Judge John C. Leggat, chairman, and by James H. Vahey, who represented the men. Fred A. Cummings, who was the arbitrator for the company, dissents from the report.

Fred A. Cummings, who dissents in behalf of the company, makes the following analysis of the results:

The basic rate of wages on this road for blue uniform men is 61 cents an hour. The differential for one-man operation is 5 cents and the basic rate is increased 1½ cents an hour. The 5-cent differential remains unchanged. The snowplow differential of 12 cents on top of the one-man car rate remains unchanged.

This award provides for time and one-half for all work performed over eight hours. It not only provides for time and one-half for all work over eight hours in the future but also time and one-half for all work over eight hours back to May 2, although the company was in no position to work the men on an eight-hour basis since that date, being bound by an agreement to work employees nine hours.

The award further provides that all schedule runs shall be no less than eight hours, which means that a number of blue uniform men must be paid eight hours for actual work performed between seven hours and seven hours and 59 minutes. In other words, the situation is that if the company wants the men on schedule runs less than eight hours it must pay eight hours, and if it does work the men eight hours it must pay 8½ hours, this latter penalty having been in existence prior to this award.

In snowplow work no overtime rate was paid on top of the one-man car differential of 5 cents plus snow rate differential of 12 cents until in the twelfth hour of a spread (by which is meant the span of time in which men might work), when an excess of 20 per cent was added, and in the thirteenth hour of the spread, when a 35 per cent excess was added. These excess rates still continue, but in addition to this, under the new award, after the eighth hour of work a snowplow worker receives the basic rate, plus the one-man car rate, plus the snow differential and one-half again the aggregate of the basic rate plus the one-man car rate plus the snow differential, which amounts to $1.19 an hour.

New time tables on the eight-hour basis are being prepared and will be put into effect within a few days. Employees in repair shops in Brockton and Chelsea and miscellaneous carhouse employees and trackmen throughout the system will go on an eight-hour basis possibly within 48 hours.

The new agreement expires May 1, 1927, and in readjusting fares the company must obtain not only sufficient money to pay current expenses at the new basic rate of wages and time and one-half penalty, but also must meet the additional burdens imposed by the award for the last five months.

To attempt to cover the cost of this

award it will be necessary to increase fares in every operating district. These new rates will go into effect on or about Oct. 1, 1926.

The wage rates for trainmen are as follows:

	New Rates* Effective 5/1/26–5/1/27, Cents per Hour	Old Rates* Effective 5/1/25–4/30/26, Cents per Hour
First three months.....	57	55½
Next nine months......	60	58½
Thereafter............	62½	61

* One-man car operators, 5 cents per hour extra.

The wage rates for bus men are as follows:

	New Rates Effective 5/1/26–5/1/27, Cents per Hour	Old Rates Effective 5/1/25–4/30/26, Cents per Hour
First three months.....	62	60½
Next nine months......	65	63½
Thereafter............	67½	66

Miles of bus route: 134.58.

New Yorkers Seek Information on Subway Policy

A constructive and significant step was taken on Sept. 29 when the Citizens' Union of New York City, N. Y., sent a letter to Mayor Walker seeking advice on the policy for building and operating new subways. Up to date no definite policy for the transportation problem has been announced by the Mayor, although he has indicated from time to time that a solution was in the making and would be announced just as soon as he was certain it was practicable. William J. Schieffelin, president of the Citizens' Union, who wrote the letter to the city's chief official, suggested four things as follows:

A single system, rather than a separate city-owned system which would be a competitor against the city's present interest in the old subways.

Radical revision of the dual subway contracts in favor of the city.

Reorganization of existing transit companies under one head as proposed by the old Transit Commission five years ago.

Higher fares on express routes only if, after these steps have been taken, a 5-cent fare still is inadequate.

In his letter Mr. Schieffelin reviewed the financial aspects of the matter. It was his conclusion that until the subway policy had been determined the solution of other city problems would naturally be impeded.

Revival Work Continues in Miami

Everybody in the organization of the Miami Beach Railway, Miami Beach, Fla., came through the recent disaster safely, but the property and equipment were damaged. Most of the cars were 3 ft. under salt water for six hours. This meant complete baking of all electrical equipment. Many wires were down, but service in the city was restored on Sunday, Sept. 26. The line to Miami Beach was washed away and many of the rails and ties had to be fished out of Biscayne Bay. On Sept. 24 it appeared unlikely that service to the beach would be restored for another ten days.

Of course other conditions were bad. There was no water for two days, but the Florida Power & Light Company did excellent work in connecting up hospitals and hotels for first aid purposes.

Lisman Plan Dismissed

Chicago Traction Settlement Proposals Attacked—Another Plan Is Offered

Awaiting presentation to the Chicago City Council of the details of the plans of New York bankers, represented by John M. Harlan and Frederick Lisman, for the solution of Chicago's transportation problems, Aldermen and local traction representatives continue to shoot holes in the proposal, while Judge Harlan and Mr. Lisman are kept busy defending their scheme.

Alderman Arthur Albert, one of the most violent opponents of the plan, made the Easterners' offer of $50,000,000 for added transit facilities appear so unfavorable that the petitioners have virtually agreed to amend their proposal in this respect. Mr. Albert's persistent queries revealed that after the $50,000,000 securities had been sold at 85 cents on the dollar, a 10 per cent construction profit and a $5,000,000 stabilization fund had been deducted from the original amount only $33,250,000 would actually be available for extensions and new equipment.

Although he agreed that the 10 per cent construction profit would probably be considered a legal charge, Corporation Counsel Busch said that the most severely criticised feature of the 1907 ordinance was a provision which allows 10 per cent construction profit and 5 per cent as the cost of money. "It is illogical to pay 10 per cent construction profit when the company does the work itself," he added.

Intimating that the present bondholders of the Chicago Surface Lines would pocket an estimated $13,900,000 annually after the ordinance expires next February, Judge Harlan proceeded to quiz Leonard A. Busby, president of the Chicago City Railway, about the plans of his company in event of receivership next February. He wanted to know if the Chicago Surface Lines would continue to pay 55 per cent of its net earnings, or $2,100,000 annually to the city, if it would spend $7,000,000 for repairs and maintenance and if it would put $4,800,000 into the renewal and depreciation fund.

Mr. Busby was emphatic in his answer that "the greatest asset of the company is good will." "Why should we destroy it by refusing to make that payment?" he asked. "I shall certainly recommend to my directorate that these payments be continued."

One of the main features of the New York bankers' plan is that it seeks only a twenty-year franchise and requires no special legislation. Mr. Harlan believes that a complete, permanent and progressive settlement of the surface transportation problem can be made under existing law, and that his plan means speed and progress, while waiting for legislation means delay. Local bankers and traction representatives, on the other hand, are unalterably opposed to an ordinance which becomes ineffective, as does the Harlan proposal, unless a city commission is created.

Still another plan to solve the city of Chicago's transportation problem was reported on Sept. 30. The plan was presented to Alderman McDonnough, chairman of the City Council committee on local transportation, by Harry R. Miller and Nicholas J. Shorn of Detroit. They revealed as their financial sponsor William L. Davis & Company, Detroit banking firm. The plan calls for coordination between buses and surface cars and the building of a downtown subway.

Subways Needed for St. Louis

A special committee of the St. Louis Board of Aldermen appointed to study the city's rapid transit needs has made public the first part of its report. It deals with findings indicating the need for subways to speed up the city's transportation. The committee does not make any final recommendations about subways, but merely confines itself to the need and feasibility of subways.

The committee has also released the second section of its report. The final sections to be released will contain specific recommendations regarding rapid transit. It is known, however, the committee favors an underground system at once for downtown St. Louis and an extension later into the outlying sections. The committee has found that St. Louis can afford to and should build subways. It estimates that subways can be provided at a cost of not to exceed 2 cents per capita a day.

The first section of its report also predicts that in 1950 the city will have a population of 1,505,800 persons in its metropolitan district on both sides of the Mississippi River at St. Louis.

It further declares that a subway is needed if downtown property values are to be maintained. These now represent 22 per cent of the city's assessed valuation.

It is clear, the report asserts, that street cars must be taken from the surface of business streets downtown and in this connection there is mention of underground sidewalks paralleling the subways to provide for crowds.

Order Restored in Baltimore

After several days, during which most of the traffic regulations in Baltimore were ineffective, the Baltimore City Council has passed an ordinance which restores all the rules which had been in effect. The action of the Council followed an opinion handed down by Judge Eugene O'Dunne, in the Criminal Court, holding that power given the Police Commissioner to promulgate rules and regulations was unconstitutional. This power had been granted by the Maryland General Assembly in 1924 and Judge O'Dunne held that it violated the state home rule amendment. As soon as the opinion was given conditions became chaotic, as only a few laws were left in effect, these being measures that had been passed by the City Council before 1924. Since that date all the rules have been made by the Police Commissioner. In order to clear the situation the City Council passed an ordinance which embodied all the rules made by the Police Commissioner. Officials, however, intend to carry the case ruled upon by Judge O'Dunne to the State Court of Appeals.

Jamestown Fare Rejected

The Public Service Commission has rejected the schedule of fares proposed by the Jamestown Street Railway and the Jamestown Motor Bus Transportation Company, Jamestown, N. Y., which provides for an increase effective Oct. 1.

The companies proposed to increase one-way fares between points in the city of Jamestown from 8 to 10 cents and to increase ticket fares from five tickets for 35 cents to three tickets for 25 cents. It was also proposed to sell ten tickets for 75 cents and to sell weekly card passes at the rate of $1 each to be good by the holder on either line. The railway lines connect the villages of Celeron, Falconer and Lakewood and the town of Ellicott and the hamlet of Ashville. The company also proposed to increase fares between Jamestown and these villages from 8 to 10 cents, and from 16 to 20 cents between Jamestown and Ashville.

The commission granted an 8-cent fare on June 22, 1920, and provided for the sale of tickets at reduced rates. It ruled that until it was shown that the present rate was not adequate this order must remain in effect.

South Shore Freight Trains Make Record

Freight service on the Chicago, South Shore & South Bend Railroad has shown a remarkable improvement since the company's re-electrification and track reconstruction program was completed during the past summer. A check on the arriving time of the morning freight train at South Bend from Chicago throughout the month of August reveals that in every instance except three, or approximately 97 per cent of the time, the train arrived before 6 a.m. On two of these occasions the train was less than 30 minutes late. Two months ago more than 68 per cent of the trains arrived later than 6 o'clock. Fast overnight service, punctual delivery and conveniently located receiving stations in Chicago are the main features upon which the new and improved freight service is being built. The line has already shown a considerable gain in traffic.

Seattle Council Favors Commission's Transit Plan

In a round-table discussion with William Pitt Trimble, head of the City Planning Commission, which has spent a year in investigating transit problems in Seattle, Wash., the City Council expressed itself in favor of the proposed rapid transit system recommended by the commission, provided it could be shown that it would be a good investment and not add too much to the railway's financial burdens. The commission has outlined a combination system of surface lines, subway and elevated lines, estimated to cost $4,000,000, and providing a rapid transit line connecting the region north of the Lake Washington canal with the down-town section of the city and south and west Seattle.

The Council expressed more interest in ways and means of financing a rapid transit system than in the physical aspects of the case.

According to figures of Mr. Trimble, the average daily loss of passengers in 1925, compared with 1924, was more than 5,000, while so far this year the loss, compared with 1925, has been 7,675 a day.

Beaver County Sends Car and Girls to Cleveland

At the invitation of the exhibit committee, the Beaver Valley Traction Company, New Brighton, Pa., is sending its industrial art advertising car to the Cleveland convention next week. Or, rather, the Beaver Valley manufacturers and citizens are sending the car, for the entire expense is being borne by the various communities in the valley. This was brought about through the medium of a beauty contest, sponsored by the railway and the Beaver Falls Chamber of Commerce, to choose the four young ladies in the valley possessing the greatest intelligence, personality and beauty. To nominate and vote for the contestants in this race it was necessary to contribute hard coin of the realm and a very imposing fund soon came into existence.

Not only will the industrial art car be on hand to illustrate the progressiveness of the Beaver Valley but the four contest winners, who were selected from a field of nearly 200 entrants and a narrowed group of 26, chosen by popular vote, will also be present at the convention to welcome all who visit the car and to distribute booklets which will give complete information on the advantages of Beaver County. These young ladies were jointly awarded the title "Miss Beaver Valley" by the judges of the contest. They are the Misses Betty Thomas of Monaca, Mary L. Guy of New Brighton, Eleanor Murphy of Beaver Falls and Mrs. George Weinman of Beaver Falls. Accompanying them will be Mrs. Loretta Werner, who will act as chaperon.

A complete description of the industrial art trolley car was published in the issue of ELECTRIC RAILWAY JOURNAL for June 12, 1926, under the title "Beaver Valley Enters the World of Art." It was the fact that so many of the industries of the valley were represented among the paintings on the sides of the car that suggested to Clinton D. Smith, general manager of the Beaver Valley Traction Company, the advisability of sending the car to the convention as a graphic illustration of Beaver County's desirability as a location for industrial activity.

On its way to Cleveland the car will pass over five different electric railway lines and, in addition, will be operated over many of the lines in Cleveland, in order that the widest publicity may be given to this traveling exhibit. It is planned to introduce the "Misses Beaver Valley" to the entire convention during one of the American Association sessions and they will also be on hand for all of the social and entertainment features of the convention. In addition to their expenses, the young ladies will receive a generous daily emolument and are already being made the recipients of many gifts and prizes from local stores and firms in the Beaver Valley.

New Fares at Buffalo Denied

The New York State Public Service Commission has rejected the new tariff filed by the International Railway, Buffalo, for a 10-cent fare in Buffalo and proportionate increases in Niagara Falls, Lockport and on its interurban lines in western New York. Instead of filing an application for permission to increase its fares, which is the usual practice within the state, the company merely filed a new tariff schedule saying it would become effective Oct. 16. Counsel for the International Railway indicated that he was paving the way for an appeal to the United States District Court for the western district of New York at Buffalo from the decision of the state utilities board. The company will contend that the present rate of fare is insufficient to meet expenses and is confiscatory.

The lines of the International Railway reach across the border into the Dominion of Canada, and the company will contend that the commission lacks authority to fix fares.

Extension of One-Man Service Authorized in Milwaukee

Formal order has been issued by the Wisconsin Railroad Commission authorizing the Milwaukee Electric Railway & Light Company to operate one-man cars on its Oakland-Delaware line. The one-man cars to be installed are similar to those now operating on the Walnut and 35th Street lines.

In its order the commission declared that permission for the one-man cars was granted on the basis of the company's promise to increase the service 20 per cent, together with the fact that previous developments had shown that one-man cars would result in improved service for this line. In his arguments before commission, city and civic officials, R. H. Pinkley, assistant general manager, declared that this line was one of the lightest traveled in the city.

More Passengers in Missouri

An increase of 25,000,000 passengers for the first six months of this year over the similar period last year is reported by the sixteen electric railways affiliated with the Missouri Committee on Public Utility Information.

In commenting on this trend in traffic a report by the Missouri Committee on Public Utility Information states:

> Despite the fact that the street railways in Missouri carried 50,000,000 fewer passengers in 1925 than in 1921, the increase for the six months ended June 30, this year, indicates that automobile congestion in the downtown districts, expense of operation and the increased difficulty in locating parking space in the downtown sections are resulting in the increased number of street car riders.

Fare Advance in Portsmouth

The Virginia State Corporation Commission has granted the Virginia Electric & Power Company's petition to put into effect a 7-cent cash fare, with tokens at four for 25 cents and school tickets at half cash fare, on its Portsmouth division. There was no opposition to the petition. The straight fare was 6 cents.

News Notes

P.R.T. Men Give $20,000 to Florida.—The Co-operative Council of the Philadelphia Rapid Transit Company, Philadelphia, Pa., recently approved payment to the Citizens' Emergency Relief Committee of a sum equal to $1 for every employee and an equal amount to be paid by the management to the Florida relief fund. The resolution, which increased the Florida fund by $20,000, was forwarded to J. Franklin McFadden, chairman of the Citizens' Emergency Relief Committee, Southeastern Chapter, American Red Cross.

Trial Period of Five-Cent Fare Extended. — The Pittsburgh Railways, Pittsburgh, Pa., has extended the time limit of the 5-cent fare on its line between 62d Street and Butler Street and Sharpsburg and Aspinwall for another 60 days or possibly longer. In announcing this step the company said that in view of the fact that no definite appraisal of the effectiveness of the 5-cent car fare had been made possible during the 60 days it has been in effect, a longer period of time would be taken to make a fair test.

Employees Compromise. — Trainmen of the Illinois Power & Light Corporation, Bloomington, Ill., voted on Sept. 16 to accept an increase of 2½ cents an hour in their wages. They had demanded 5 cents. The new scale is retroactive to July 2 and will be effective for two years.

Proposes Rapid Transit Over Steam Line in Chicago.—Rapid transit service for areas in Chicago, Ill., not now served would be provided under a plan which the City Council ordered under investigation on Sept. 17. Alderman John Toman, author of the proposal, suggested that electrically driven cars be operated over steam railway lines radiating from the Loop district. He said that only a small expense would be involved in providing for the supplementary service.

Reduced Tickets for School Children.—R. Bly Wagner, manager of the Pine Bluff Company, Pine Bluff, Ark., announced recently that street car tickets in books of 20 for 50 cents per book, or at the rate of 2½ cents per trip, are being issued for the use of the school children. On account of the low fare rate, use of these tickets is restricted to children attending public and private grammar and high schools, and are good any time between the hours of 7 a.m. and 6 p.m.

Fares Increased in Johnson City.—Increase of 2 cents in fare by the Johnson City Traction Corporation, Johnson City, Tenn., will be allowed by the State Public Utilities Commission as soon as the company puts into service four new one-man-operated cars. The new fare will be 7 cents. The company asked to be allowed 8 cents. Despite an inquiry by the commission as to overhead expenses, W. H. Baldwin, vice-president of the Tennessee Eastern Electric Company, which owns the traction company, and other officials convinced the commission that even elimination of the objectionable items would not enable the company to make a profit.

Seeks to Operate One-Man Cars.—The Eastern New York Utilities Corporation, formerly known as the Albany Southern Railroad, and operating an electric railway between Albany and Hudson, N. Y., has filed with the Public Service Commission a petition to operate its lines with one-man trolley cars, changing the present type of car for this purpose. A public hearing will be held on this application later.

Men Restrained from Joining Union.—Employees of the Interborough Rapid Transit Company, New York, N. Y., who join the Amalgamated Association, which is affiliated with the American Federation of Labor, will be subject to prompt dismissal. Frank A. Hedley, president and general manager of the company, says that membership in the Interborough Brotherhood carries with it a pledge not to join any other union and that this pledge is part of the contract of employment. His statement to the men was called forth by the effort of organizers of the Amalgamated to obtain recruits from the Interborough union, particularly from former members of the Consolidated Railroad Workers of Greater New York.

Safety Work Bonus to Memphis Men.—Extra pay amounting to $6,387 is to be distributed shortly to motormen and conductors of the Memphis Street Railway, Memphis, Tenn., this amount representing savings effected by reducing accident costs during June, July and August. Under the plan the company divides with the men the amount saved each month, but distributes the awards at the end of each quarter. Records of the company over a period of years showed that 4.25 per cent of the gross receipts had been required for accident costs.

Parking Prohibited. — Intercity bus lines operated into Madison, Wis., by electric railways and independent owners are prohibited, under an ordinance just enacted by the Common Council, from parking on any street on the Capitol Square for a period longer than it actually requires to load and unload passengers. The same ordinance provides that after Jan. 1, 1928, no bus station will be allowed within two blocks of the Capitol Square where it is necessary to take on and discharge passengers in the street.

Courses for P.R.T. Men.—The Philadelphia Rapid Transit Company, Philadelphia, Pa., announced recently that it would provide educational courses during the fall and winter to give employees an opportunity for a "broader understanding of the principles underlying the company's co-ordinated system and its varied activities." The courses will be under the direction of officials of Mitten Management, Inc., and will include a wide variety of subjects under the general headings as follows: "Public Relations with a Background of Transportation and Public Utility Economics," and "Handling Men."

Foreign News

Subway for Japan

Tokyo will be the first city of the Far East to have a subway. This new underground road will be constructed in a manner similar to the plan used in New York City in that it is open cut and roofed over with steel, the tube being square and located a comparatively short distance below the surface of the street. The civil engineering work of this link, which will connect two very densely populated sections of Tokyo, has been about 50 per cent completed. The first rolling stock will include ten steel cars, each of which at first will be provided with two motors of 120-hp. rating. The motors are being furnished by the International General Electric Company, through Mitsui Bussan Kaisha. It is one of ten sections projected for Tokyo, this section being constructed by the privately owned Tokyo Underground Railway. The nine other sections may be constructed by the Tokyo municipality in the future.

Number of London Buses Reduced.—In a statement issued at the House of Commons recently the number of licensed omnibuses in the Metropolitan area is shown for Jan. 31 and June 30 of the present year. The figures are:

	London General Omnibus Co. and Associated Companies	Independent Proprietors	Total
Jan. 31, 1926	4,718	611	5,329
June 30, 1926	4,571*	474	5,045

*Including 99 omnibuses now controlled by the L. G. O. Co. which on Jan. 31 were independent.

Tram Cars May Replace Gondolas—If proposed plans are approved by the city officials of Venice, to unite five other communes with the city by bridges, over which electric cars will be operated, it will mean that the tramcar will practically replace the gondola. This method of transportation is now being advocated by the Cabinet. The arrangement proposes to connect Venice and the communes of Mestre, Tavaro, Chirignago, Zellarino and Fusino.

London Underground Has Longest Subway—Free passage was given to 3,000 people on the opening day of the Morden extension of the City & South London Railway, Sept. 13. This extension of 5½ miles gives to this property first claim to the longest underground railway in the world. It is 16½ miles long, connecting North and South London from Golders Green to Morden, and takes 53 minutes running time. The other route of the tunnel is by way of Charing Cross, which is 15 miles long and takes 49 minutes. The area covered will serve 2,500,000 people. If the line is to pay, however, at least 12,000,000 passengers must use it yearly. At the southern terminus there has been erected a large garage by the company for the accommodation of automobile owners who wish to leave their cars and continue the journey by tube.

Recent Bus Developments

Jitney Proposal Defeated in Detroit

Electors Support Contention of City Officials that Municipal Railway Should Have Monopoly

Another blow was dealt the jitney operators in Detroit, Mich., at the election on Sept. 14 when the people defeated the initiatory ordinance proposed by the jitney organizations for regulating the operation of jitneys on Detroit streets. The amendment which was defeated would have allowed 500 jitneys to operate under city license on Woodward, Jefferson and Grand River Avenues and Fort Street.

An active campaign to defeat the amendment at the polls was waged by Mayor Smith and other administration officials, but the defeat of the proposed amendment is not considered as the final action by the jitney drivers. In the meantime, pending the hearing before the United States Supreme Court, the jitneys are operating as usual. Before the ballot, the Corporation Counsel proposed that a stipulation be signed to the effect that both the jitney organizations and the city officials would abide by the decision made by the voters. Edward N. Barnard, attorney for the jitney drivers, would not agree to the proposal.

The Corporation Counsel's office has engaged New York counsel to look after the city's interest when the case is reviewed before the U. S. Supreme Court.

New motor coach service has been started by the Department of Street Railways on a five-minute schedule on Woodward Avenue to combat the jitneys. A 10-cent fare is charged for passengers riding between the Detroit River and Six-Mile road, with the added inducement of free transfers to railway lines. These coaches are single-deck, 21-passenger buses which stop at all street crossings to take on or discharge passengers. With these coaches a comfortable ride is offered at a lower rate of fare than the jitneys charge.

It was pointed out by the Street Railway Commission that the jitneys take from the municipal street railway system a large portion of the most profitable central traffic in Detroit without relieving the D. S. R. of a single line of its unprofitable routes, many of which must be operated at a loss. The principle of operation embracing the use of the profitable downtown lines to support the lightly traveled outlying lines obviously cannot be applied with jitney competition.

The recent decision at the polls is looked upon by the city officials as a renewed pledge of faith in municipal ownership. The proposed amendment to the ordinance was considered an attempt to wrest from the people the control of city streets, for which a 30-year battle was fought.

It was stated by the commission that while the jitneys serve only four downtown lines, the Department of Street Railways operates 55 lines, for service, not profit. In depriving the city of $1,000,000 in revenue last year, the jitneys reduced the D. S. R. revenues by an amount sufficient to purchase 72 new street cars or 75 double-deck, 60-passenger gas-electric motor coaches similar to the 50 which the city has purchased and which are now being delivered, under the terms of the contract with the bus manufacturers.

It was brought to the attention of the people that extensions of city railway and motor coach service to outlying sections and the continuation of the present 6-cent fare depended largely on the elimination of the jitney.

Baseball Enthusiasts Travel by Bus in Boston

Ten buses were chartered from the Boston Elevated Railway during the recent baseball season to enable employees of the Houghton & Dutton Company, Boston, to reach the Fenway Park baseball grounds quickly without encroaching upon track capacity of the local railway. There is a department store baseball league in Boston the games of which begin in the late afternoon, and in order to take advantage of daylight saving and reach the grounds as soon as possible after the stores close, the bus was utilized. The Houghton & Dutton store is located about half way between two busy subway stations crowded with traffic during the late afternoon, and the use of the bus in this case was advantageous from every viewpoint. The accompanying illustration was taken from the Boston office of the ELECTRIC RAILWAY JOURNAL in Tremont Temple.

Boston Fans Handled by Buses Which Were Specially Chartered from the Elevated

Menominee Favors Bus—Marinette Issue Pending

The Menominee, Mich., Common Council has expressed itself in favor of the installation of bus service in that city. As the first step in this direction the Council has instructed the franchise committee to investigate the practicability of offering a franchise to a bus company which would guarantee adequate service, preferably the Menominee & Marinette Light & Traction Company.

Contrary to the stand taken by the Council of Menominee, the Council of Marinette, at a meeting in August, refused to allow the railway to use buses on a three months basis in an attempt to wipe out the deficit which it is now experiencing in the operation of its twin city street car line. At a later meeting, however, the Council unanimously passed a resolution authorizing Councilmen to visit the bus systems operated by the railways in Manitowoc and Sheboygan.

After the refusal of above-mentioned Council to permit bus service on a trial basis, the company applied to the Railroad Commission for permission to increase its railway fares. Should the commission approve the proposed scale, cash fares will be 10 cents instead of 7, tickets three for 25 cents instead of ten for 50 and rates for children between four and twelve years of age from 4 to 5 cents. The question of bus operation will be deferred pending the return of the Aldermen from their tour of investigation.

Another Stage in Buffalo's Municipal Bus Venture

Mayor Frank X. Schwab of Buffalo, N. Y., was authorized by the City Council recently to invite corporations to operate buses within the city under the terms of a contract which provides for the payment of 20 cents per mile of operation, the money to apply on the purchase price of the buses by the city. Details of the proposed contracts were not revealed at the Council session, but the Mayor promised the Council he would submit within the next two weeks the names of the companies which will operate buses under the new form of contract. Mayor Schwab said he had no intention of giving up his municipal bus venture.

Questioned by other members of the City Council, Mayor Schwab said that the $10,000 which the Council appropriated for initial operating expenses of the municipal bus routes and which already had been paid to John C. Montana, who operates interurban buses in western New York, and to the White Motor Company, had not been lost to the city and would apply on the purchase price of the buses if the city voted to buy them. The new form of contract under which the city would pay 20 cents per mile of operation, the Mayor said, was modeled after a bus contract made in the city of Detroit when municipal bus lines were first operated.

Besides asking that he be given authority to enter into a new bus contract, the Mayor advocated the establishment of a zone system of fare payment.

Stagger Arrangement in Neenah

A three-cornered agreement was finally reached by officials of the city of Neenah, Wis., the Railroad Commission and bus transportation companies at a recent conference held in Neenah for the purpose of regulating the operation of interurbans and buses in the hope of solving the traffic problem. A one month's trial will be made beginning Oct. 1 to regulate all transportation lines. This will be attempted by having buses of the traction company leave at five minutes after and 25 minutes before each hour and buses of the Homan Bus Company leave 25 minutes after and five minutes before each hour, while the Neenah-Appleton interurban cars will remain on the same schedule of fifteen minutes before and after each hour. A ten-minute service will thus be provided between Neenah and Appleton. A system of skip stops will also be introduced to cut down the number of stops by buses. At present buses stop anywhere.

Bus Operator Seeks to Use Weekly Pass.—Application for the use of the weekly pass was made before the Public Utilities Commission at Hartford, Conn., on Sept. 28 by John T. L. Hubbard, counsel for the Lordship Railway. The latter operates bus lines between Bridgeport and the communities of Lordship Park and Avon Park. Arguments in support of the application were made by Mr. Hubbard, Edwin M. Walker, president Schenectady Railway, and Walter Jackson. W. J. Flickinger, vice-president of the Connecticut Company, and various jitney operators protested the application. The commission reserved decision.

Abandons Bus Line.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., discontinued the operation of its Beaver Dam bus line, effective Oct. 1. Unlike its other bus lines running into the lake regions, the Beaver Dam line was not heavily patronized during the busiest summer months.

Buses on Trial for One Year.—The Peninsular Railway has been authorized by the Railroad Commission to continue experimental operation of buses in the city of Palo Alto, Cal., for one year from Sept. 28, 1926. The petition is granted on condition that such service may be discontinued on 90 days notice if it be found that the revenues are insufficient to warrant operating. The bus service in question was authorized by the Railroad Commission a year ago as a substitute for the electric railway line abandoned at that time. The railway had found after one year of operation that the service was not paying its way.

Objects to Bus Application.—The International Railway, Buffalo, N. Y., appeared recently before Public Service Commissioner Pooley in opposition to the application of John F. Burke, receiver for the Hamburg Railway, Buffalo, for permission to operate buses between Hamburg and Buffalo to amplify the company's service. The company seeks to operate two passenger buses on an hourly schedule between Hamburg and Lafayette Square at Main Street in Buffalo, charging a 40-cent fare to Hamburg and 20-cent fare to Lackawanna and zone rates between these two points. The International Railway complained that the proposed bus line would take passengers to Lackawanna in competition with the South Park car line. Decision by the commission was reserved.

Bus Line Authorized.—The Charleston Interurban Railroad was granted a permit recently by the City Council of Charleston, W. Va., to operate on Piedmont Road to Greenbrier Street and through the residential thoroughfares north of Washington Street. The new bus line, which will be started in the near future, will have its terminal at the corner of State and Summers Streets.

Bus Certificate Granted.—The Illinois Commerce Commission on Sept. 22 granted the Alton, Granite & St. Louis Traction Company a certificate of convenience and necessity to operate buses connecting East St. Louis, National City, Brooklyn, Venice, Madison, Granite City and Nameoki to Mitchell, Ill., and from Mitchell to Hartford, Woodriver, East Alton and Alton. At the same time the commission dismissed the applications of the Pioneer Motor Transportation Company, Prairie State Bus Line and Superior Motor Bus Company for certificates to serve the same territory.

Would Operate in Binghamton.—The Binghamton Railway Bus Lines, Inc., has filed a petition with the Public Service Commission for permission to operate buses in the city of Binghamton, N. Y., and adjoining territory. The company proposes a 30-minute schedule from 6 a.m. to 12 p.m. weekdays and 7 a.m. to 12 p.m. on Sundays. The fare is to be 7 cents. Transfers will be permitted from the bus line to the street cars of the Binghamton Railway under the same rules as prevail at present. A public hearing will be held on the application.

Buses Used on Extension.—The Key System Transit Company has applied to the California Railroad Commission for a certificate to operate an extension of its Thousand Oaks line. Buses will be used between the intersection of the Alameda and Monterey Avenue and the intersections of Colusa Avenue and Fairmont Avenue and intermediate points in the city of Berkeley.

Would Substitute Buses. — The Bus Transportation Company, subsidiary of the Denver Tramway, Denver, Col., has asked for a permit to operate buses between the western city limits of Denver and Arvada, Col. The tramway desires to operate buses because its electric lines in this vicinity do not pay.

Suburban Line Denied Bus Grant.—The Pennsylvania Public Service Commission recently refused a petition for a certificate of public convenience to the Southern Pennsylvania Bus Company for the right to operate a bus line between Chester and Darby. The applicant is a subsidiary of the Southern Pennsylvania Traction Company, Chester, Pa., which operates a double-track railway between these points. Various communities along the line protested against the bus line, claiming that the roads are already heavily traveled traffic arteries. The commission in its decision said that although the terminal points were important centers they were now served not only by a number of railway lines but by steam lines as well. It was possible, the commission felt, in this rapidly growing territory that conditions might change where bus service would become necessary in addition to existing facilities, but at the present time the commission was not convinced that public necessity required the additional service.

Franchise Canceled—Buses to Be Operated.—The City Council of Vancouver, Wash., has received authorization to let an exclusive franchise for bus lines to be operated to the district recently served by street cars. Applications for such service will be received after Oct. 1. Earl S. Nelson, president of the Clark County Development Company, which corporation managed the railway lines, has signed on behalf of his company an agreement reached with the City Council relative to repairing streets on which the tracks of the Vancouver electric railway are located. With this agreement signed the Council approved the ordinance canceling the franchise held by the company. Service of street cars on the Orchards-Sifton line as previously reported was to cease on Oct. 1. Other lines are to continue until the middle of October or until suitable bus service can be instituted.

Buses and Cars to the Fair. — The Reading Transit Bus Company, an associate of the Reading Transit Company, Reading, Pa., operated buses in conjunction with railway cars to give patrons the advantage of direct transportation between their homes and the Reading Fair Grounds. The charge on the buses was 10 cents, while the regular 7-cent fare continued on the cars. Persons wishing to avail themselves of the railway and bus service in visiting the fair, which opened on Sept. 14, were able to make the trip from their homes direct to the entrance gates for a fare of 17 cents.

Would Operate in Troy.—The Public Service Commission held a hearing on Sept. 22 on the application of the Capitol District Transportation Company, Inc., a subsidiary of the United Traction Company, for a certificate to operate a bus line in the city of Troy. The bus company proposes to operate over the so-called Albia division of the traction company, which the company at the same time petitioned to abandon. The city of Troy has by action of its Common Council consented to the abandonment and the substitution of buses. The bus company has agreed to a system of transfers with the United Traction Company lines, to a minimum of 22 buses with a minimum schedule of ten minutes and a five-minute schedule during rush hours; to the payment of a license fee of $75 per year for each vehicle operated; to the storing of the buses in the Albia carhouse of the United Traction Company, and to the removal under the direction of the city engineer of the poles, wires, tracks, ties and all other paraphernalia now used in the operation of the trolley line.

Financial and Corporate

New Jersey Company to Split Stock

Three for One Division of Common Proposed—Dividends on Preferred to Be Paid Monthly

Directors of the Public Service Corporation of New Jersey, among the subsidiaries of which are the Public Service Railway and the Public Service Transportation Company, announced on Sept. 28 that they would recommend to shareholders that the common stock outstanding be divided in a ratio of three to one and also that eventually the new stock would be put on the equivalent of a $6 dividend basis as against the present rate of $5. The directors also will recommend that authorized preferred stock be increased from $100,000,000 to $200,000,000 and that the authorized amount of no-par value common shares be increased from 2,000,000 to 10,000,000 shares. The corporation does not intend to offer any additional common stock for subscription by stockholders.

The board will further recommend that dividends on 6 per cent cumulative preferred stock be paid monthly instead of quarterly. Under the recommendation, the authorized 6 per cent cumulative preferred stock would be increased from $25,000,000 to $125,000,000. The authorized 8 per cent cumulative preferred would remain at $25,000,000 and the authorized 7 per cent cumulative preferred at $50,000,000. On Sept. 25 there were outstanding 1,192,425 shares of no-par common, 215,312 shares of 8 per cent cumulative, 288,570 shares of 7 per cent cumulative and 51,973 shares of 6 per cent cumulative preferred.

In commenting on the proposals Thomas N. McCarter, president, said:

> The recommendations are in the interest of more economical financing and a wider distribution of stock holdings among the public. While it is expected that much new capital will be obtained through the sale of our 6 per cent cumulative preferred, at the same time, because of favorable results of operation, common stock of the corporation is coming into favor as an investment and through the lower selling price to result from division will undoubtedly become more attractive to investors of moderate means.
>
> At the proper time I shall recommend to the board that the new stock be placed upon a $2 a year dividend basis. The proposal to pay monthly instead of quarterly dividends on the 6 per cent cumulative preferred is for the purpose of giving another attractive feature to this security, which is being sold direct to the public by employees of our operating companies.

P. R. T. Stock Increase Approved

The shareholders of the Philadelphia Rapid Transit Company, Philadelphia, Pa., at a special meeting on Sept. 22 approved an increase in the company's preferred stock from $18,000,000 to $23,000,000. The new stock, when issued, will bring the total capitalization up to $53,000,000, it having $30,000,000 common stock outstanding.

Under the stockholders' approval, the company will issue $5,000,000 additional preferred stock, the proceeds to go for capital additions and improvements during next year, including expenditures for track improvements and extensions, retirement of underlying securities, bus equipment and garaging.

According to a statement made to the City Council when that body was considering the question of increased stock under the city-rapid transit agreement, it was stated $1,550,000 of the new preferred stock would go toward the retirement of underlying securities, including rapid transit bonds and car-trust certificates and similar securities of underlying companies, $1,700,000 for normal capital expenditures and $1,750,000 for additional buses. Common stock holders of the company have waived their right to buy the new preferred stock and it will shortly be offered to car riders on a partial payment plan. The par of the new stock will be $50 and dividends of 7 per cent will be paid.

Toronto Commission Would Abandon Radials

During the negotiations for the transfer of the York Radials to the Toronto Transportation Commission, Toronto, Ont., the latter body submitted to the Board of Control on Sept. 17 a recommendation that the lines, owned by the city, should be abandoned. The commission gave as its reason that deficits would increase further if the radials continued to operate. Although the city under an agreement with the Ontario Hydro-Electric Power Commission, has had to assume the deficits of the last four years of operation of the radials, the board of control at a recent conference with the Toronto Transportation Commission voted unanimously that that body should take care of any future deficits, provided it assumed operation of the radials.

Mayor Foster said that the time had arrived for the city to cease shouldering the burden of about $25,000 annually. If the only way to effect the saving was to abandon the radials, then he was prepared to go ahead and do so. Ultimately, he believed, it would be a matter for the voters of the city of Toronto to decide.

$300,000 for Tacony Line

Settlement was made on Sept. 24 by the Philadelphia Rapid Transit Company, Philadelphia, with the Northeastern Philadelphia Transit Company for the acquisition of the old Frankford, Holmesburg & Tacony Railroad. The announcement was made by Albert M. Greenfield, representing the stockholders. A price of $300,000 was agreed upon last spring and the Public Service Commission has approved. Mr. Greenfield announced that the road would be rebuilt and become a part of the P. R. T. system. It will operate from Blakiston Street to the Frankford "L" terminal at Bridge Street. One fare will be charged and free transfers will be given to and from the line at the "L" terminal.

Rate Settlement in Memphis

New Tentative Base of $10,674,452 Recalls 1919 Investigation—Approval Awaited

A compromise on a suit now pending in the Supreme Court of Tennessee involving the rate base of the Memphis Street Railway, Memphis, Tenn., was effected recently. Mayor Paine has approved the terms which settle $10,674,452 as the rate base. Recommendation for this settlement was made by Ross Harris, valuation expert employed by the city, and E. B. Klewer, city attorney. The settlement will have no immediate bearing on the fare charged by the company. By the terms of the agreement the company will dismiss its appeal to the Supreme Court, thereby making the opinion of the court of civil appeals, which sustained the material contentions of the city, final. Mayor Paine, in approving the terms of the settlement, traced the history of the litigation.

The Railroad and Public Utilities Commission on July 12, 1919, ordered an investigation to ascertain the value of the property as of July 1, 1919, so that it could be determined upon what proper values the company was entitled to earn a fair return.

Valuation reports were made by A. S. Richey, representing the commission; J. H. Perkins, representing the receivers of the company, and Ross Harris, representing the city, and early in 1920 the utilities commission fixed the rate base as of July 1, 1919, at $11,846,034, in which was included $787,579, for development costs and $1,930,544, representing the value of superseded property. To the inclusion of the last two items in the rate base the city objected and filed a certiorari to review the findings of the commission in the Circuit Court of Davidson County, in Nashville. The city lost this case in the Circuit Court and appealed to the Court of Civil Appeals.

Reproduction Cost Overlooked

That court decided that while the commission erred in including in the rate base items for superseded property and development costs complained of by the city, the commission should have given, but failed to give, due weight to the reproduction cost of the property of the company—that is, what it would cost to reproduce the physical properties of the company, as of the date fixed, less accrued depreciation—and remanded the case to the utilities commission for a revaluation in accordance with the principles announced by the court. Then the company took the case to the Supreme Court by certiorari.

Since the reproduction cost would equal, if not exceed, the rate base as fixed by the commission, and since the rate of fare would not be affected, and in view of the enormous cost of a revaluation hearing, it was deemed advisable to compromise the law suit, the Memphis Street Railway having agreed to pay all costs. The new rate base, tentatively agreed upon, must be approved by the commission. If adopted, it is substantially the same as the rate base heretofore fixed by the commission, the difference being due to deductions made since 1919, by the sale of certain properties of the company.

The Memphis Street Railway's rate base case was one of the very first coming before the commission after its organization in 1919. At that time the courts were not agreed as to the basis on which a value for rate making purposes should be fixed. Since that time the Supreme Court of the United States, and courts generally, have announced the rule that the reproduction cost less depreciation is a controlling factor in fixing a valuation of public utility properties for rate making purposes.

Even if the city had sustained all its contentions in the suit, a reduction in fares would not have been justified by the earnings of the company, due to loss in revenue passengers carried and because of the increased use of automobiles.

Receiver for Colorado Road

As the result of a suit in equity brought by the Guaranty Trust Company of New York, trustee for the bondholders, the Denver & Interurban Railroad, operating between Denver and Boulder, has been placed under a receivership. Judge Foster Symes of the U. S. District Court at Denver named as receiver W. H. Edmunds, general manager of the road since its operation began in 1909. Mr. Edmunds expressed the opinion that discontinuance of service was desired.

In December, 1924, the electric line started bus service over virtually a parallel route. It received the support of the city of Boulder in its application for a certificate of public convenience and necessity at that time. The city now claims that the road officials promised electric service would not be discontinued if the bus franchise were secured.

The Denver & Interurban Railroad was a paying property during the first ten years of its operation. It was in the hands of a receiver from 1918 to 1920, war conditions being responsible for its failure to pay.

Information laid before the court by Receiver Edmunds in his request for instructions sets forth that operating profit was $6,782 in 1921 and $27,095 in 1922. Since then, however, the line has lost money, the figures being: 1923, $13,051; 1924, $42,226, and 1925, $53,514. Losses this year total $51,217 to Aug. 1.

The line operates eighteen schedules daily, the one-way distance being 30 miles. Employees number 42 and the monthly payroll is $8,000. Power costs average $2,800 monthly. Single-phase current is utilized. Cars installed in 1909 are still in use. The round-trip fare on the line is $1.80, with one-way tickets selling for $1. Lower rates prevail on a commutation basis.

The bus line has proved successful. Six runs each way daily were operated at first. This was later increased to eleven each way, two more than the electric line. Tickets have been interchangeable on the bus and electric railway line.

The bonded indebtedness of the electric line is $1,250,000. In its suit the Guaranty Trust Company stated that the road was delinquent in interest payments on the bonds.

$204,706 Profit in Seattle

Operation of Municipal Railway in 1925 Results in Decreased Revenues—Number of Accidents Decreases

EARNING figures of the Seattle Municipal Railway, Seattle, Wash., for the year ended Dec. 31, 1925, reveal a net income considerably lower than for the year previous but higher than for 1923. Net income in 1925 was $204,706, compared with $557,243 in 1924 and $169,636 in 1923. No explanation of the lowered net income was included in the report, which is devoid of text except for the chronology. However, a perusal of the statistical tables shows a

INCOME STATEMENT, SEATTLE MUNICIPAL STREET RAILWAY

	1925	1924
Operating revenues	$5,950,204	$6,119,290
Operating expenses	5,031,917	4,807,538
Operating income	$918,287	$1,311,752
Miscellaneous revenue	12,196	11,699
Gross income	$930,483	$1,323,451
Deductions from gross income	725,776	766,207
Net income	$204,707	$557,244

PROFIT AND LOSS

Losses accrued (other than income) current annual period.		
Adjustment of accounts receivable		$590
Delayed losses accrued in prior periods:		
Cost of retiring property	$19,013	
Property retired not fully depreciated	159,362	
Loss on land sold	17,418	
Adjustment of accounts receivable	1,058	
		$196,852
Net income (profit and loss) gain		25,746
		$223,187
Net income		204,707
Gains accrued (other than income) current annual period		1,244
Delayed gains, accrued in prior periods		13,504
Unearned increase of plant		3,731
		$223,187

OPERATING STATISTICS OF THE SEATTLE MUNICIPAL STREET RAILWAY

	1925	1924
Car-miles operated	15,717,484	15,883,567
Car-hours operated	1,700,450	1,717,052
Bus-miles operated	559,236	414,720
Bus-hours operated	57,135	43,542
Total car-miles	16,276,720	16,298,287
Total car-hours	1,757,585	1,760,594
Average speed	9.27	9.26
P. S. E. transfers	7,033	7,063
S. & R. V. transfers	883,418	882,738
Jitney transfers	481,775	414,798
Passengers at 2½ cents	2,200,758	2,151,501
Passengers at 3 cents	59,527	58,078
Passengers at 8⅓ cents	63,994,015	66,060,792
Passengers at 10 cents	4,827,790	4,841,895
Total pay passengers	72,454,316	74,416,865
Deadheads	1,007,590	1,152,735
Transfers	18,995,932	18,697,374
Total passengers	92,457,838	94,266,974
Pay passengers per car-mile	4.4514	4.5659
Total passengers per car-mile	5.6804	5.7839
Total passengers per car-hour	52.6050	53.5427
Passenger revenue	$5,909,486.75	$6,083,238.19
Miscellaneous revenue	52,914.16	47,751.16
Gross revenue	5,962,400.91	6,130,989.35
Revenue per car-mile	.366315	.376174
Revenue per pay passenger	.082[illegible]2	.082387
Revenue per total passenger	.064488	.065039
Expenses, including depreciation	$5,031,917.72	$4,807,538.52

STATISTICAL AND COMPARATIVE REPORT OF OPERATION OF THE SEATTLE MUNICIPAL STREET RAILWAY

Revenue—Operating	1925 Amount	1925 Per Car-Mile Cents	1925 Per Car-Hour Cents	1924 Amount	1924 Per Car-Mile Cents	1924 Per Car-Hour Cents
Passenger car revenue	$5,851,959	35.95	332.95	$6,043,981	37.08	343.29
Special passenger car revenue	1,205	.01	.07	593	0	.03
Automobile bus revenue	57,526	.35	3.27	38,662	.24	2.20
Municipal department passenger revenue	48,000	.29	2.73	48,000	.29	2.73
Freight revenue	32,434	.20	1.85	29,621	.18	1.68
Mail revenue	22,776	.14	1.29	19,395	.13	1.10
Miscellaneous transportation revenue	....	......	......	12	0	0
Discounts and adjustments	*63,699*	*.39*	*3.62*	*60,976*	*.37*	*3.46*
Total operating revenue	$5,950,204	36.55	338.54	$6,119,290	37.55	347.57
Miscellaneous Revenues and Expenses:						
General shops	*$34,685*	*.21*	*1.97*	*$40,086*	*.25*	*2.28*
Service equipment	*2,605*	*.02*	*.15*	*2,351*	*.01*	*.13*
Utility equipment	728	0	.04	*182*	*0*	*.01*
Electric current sold	797	0	.05	946	.01	.05
Rental of real estate and buildings	4,410	.03	.25	4,024	.02	.23
Rental of tracks and way facilities	22,071	.14	1.26	23,892	.15	1.36
Rental of transportation equipment	1,071	.01	.06	1,578	.01	.09
Station and car privileges	18,731	.12	1.06	22,335	.13	1.27
Lost and found department	*246*	*0*	*.01*	*296*	[illegible]	*.02*
Other miscellaneous Revenues and expenses	1,923	.01	.11	1,840	.01	.10
Total miscellaneous revenue	$12,196	.08	.70	$11,699	.07	.66
Total gross revenue	$5,962,400	36.63	339.24	$6,130,989	37.62	348.23
Summary of Operation:						
Way and way structures	$498,345	3.06	28.35	$459,717	2.82	26.11
Conducting transportation	2,144,246	13.17	122.00	2,022,303	12.41	114.86
Maintenance of transportation equipment	471,367	2.90	26.82	455,935	2.80	25.90
Housing and hostling transportation equipment	218,152	1.34	12.41	206,294	1.27	11.72
Power	617,488	3.79	35.13	624,815	3.83	35.49
Commercial	65,986	.41	3.75	53,472	.33	3.04
General	332,773	2.04	18.93	299,885	1.84	17.03
Depreciation and amortization	683,556	4.20	38.91	685,114	4.20	38.91
Total operating expenses	$5,031,917	30.91	286.30	$4,807,538	29.50	273.06

INCOME STATEMENT

	1925 Dr.	1925 Cr.	1924 Dr.	1924 Cr.
Operating revenues	....	$5,950,204	....	$6,119,290
Operating expenses	$5,031,917	....	$4,807,538	....
Operating income	....	918,286	....	1,311,751
Miscellaneous revenues and expenses	....	12,196	....	11,699
Gross income	....	930,483	....	1,323,450
Deductions from gross income	725,776	....	766,207	....
Net income	....	204,706	....	557,243

CONDENSED BALANCE SHEET OF SEATTLE MUNICIPAL STREET RAILWAY AS OF DEC. 31, 1925

CAPITAL ASSETS		
Total capital assets		$13,578,403
Total interest, redemption and special fund assets		355,343
Total current assets		1,190,400
Total deferred charges		60,852
Deficit—Dec. 31, 1925		590,182
		$15,775,182
CAPITAL LIABILITIES		
Bonds outstanding:		
General lien bonds		$775,000
Utility revenue bonds		13,524,500
Total capital liabilities		$14,299,500
REDEMPTION AND SINKING FUND LIABILITIES		
Unmatured accrued interest on funded debt:		
General lien bonds	$7,812	
Utility revenue bonds	225,240	
		$233,052
Special guaranty deposit (repayable)		300
Matured unpaid interest on funded debt		3,244
Audited and approved claims and depreciation reserve fund loans payable		28,219
Total interest, redemption and special fund liabilities		$264,817
CURRENT LIABILITIES		
Current fund loans payable:		
To general fund		$264,133
To bond funds		227,000
To depreciation reserve fund		90,000
		$581,133
Amounts reserved on contractor's estimates		23,395
Tokens outstanding		74,156
Audited and approved claims payable		250,918
Warrants outstanding		243,429
Total current liabilities		$1,173,031
		$15,775,182

PAYROLLS AND VACATIONS—1925

Transportation:	Payrolls	Cost of Vacations
Office, inspectors, station masters	$107,541	$4,306
Trainmen	2,100,778	87,696
Shops and carhouses	559,047	15,157
Way and structures	525,187	20,152
Accounting	89,864	3,899
Total	$3,382,416	$131,210

SEATTLE MUNICIPAL STREET RAILWAY SEGREGATION OF PASSENGER CAR-HOURS AND CAR-MILES

	Car-Hours	Car-Miles
One-man single truck	175,268	1,336,557
One-man double truck	715,769	6,878,412
Two-man	788,806	7,427,906
Buses	57,135	559,236
Total	1,736,978	16,202,111

decline of $169,086 in total operating revenue and an increase of $224,379 in total operating expenses.

Included in the history are the fluctuations in the fare rate from May 9, 1914, when the cash fare was 5 cents with six tickets for 25 cents, to June 16, 1923, when a cash rate of 10 cents and a token fare of 8⅓ cents went into effect. Employees numbered 1,869, of whom 1,192 were trainmen receiving from 60 cents to 77 cents an hour. There was a slight decrease in the number of accidents. The total number in 1925 was 6,322, against 6,443 in 1924. Still the amount paid for injuries and damages was higher in 1925, being $78,567, against $65,105 in 1924.

Petitions for Valuations Rejected.—The California Railroad Commission has dismissed applications of the city of Oakland and the city of Alameda for a valuation of the property of the San Francisco-Oakland Terminal Railways, Oakland, Cal.

Increase in Net Income on Brooklyn City

For the year ended June 30, 1926, the Brooklyn City Railroad, Brooklyn, N. Y., realized a net income available for dividends of $1,422,736, compared with $1,411,576 for a similar period the year previous. Gross revenues from transportation were $11,399,373, an increase of $36,092 compared with the previous year. Total operating expenses decreased from $9,077,698 for the previous year to $8,963,104. During the year 230,355,382 revenue passengers were carried, compared with 229,613,538 in the preceding year. A higher standard of service was accorded the public, the seat-miles per car-mile increasing from 45.71 to 47.12.

Interest charges showed an increase from $282,688 to $500,810 due to the interest on the $1,627,000 first consolidated mortgage 5 per cent bonds sold on July 1, 1925, and the interest on the equipment trust series "A" 5 per cent certificates issued in January, 1925. The proceeds from the sale of these securities were used to make payments on account of the new cars, to reimburse the company for expenditures on its shops, to purchase materials and supplies and for other corporate purposes. This increase was in part offset by a reduction in the amount paid for rentals of cars and tracks from $204,832 to $79,275 due to the use during a portion of the year of the newly purchased cars in lieu of others previously rented.

Pursuant to order of the Transit Commission of the state of New York dated May 24, 1925, the company is proceeding with the inventory and appraisal of its property and it is said that the same will shortly be completed and ready for presentation.

All the 335 new modern type cars contracted for in 1925 were delivered and placed in operation during the summer and fall of 1925. As of Jan. 1, 1926, various agreements having to do with the joint expense of maintenance of track, roadway and cars by the Brooklyn City and the Brooklyn-Manhattan Transit Corporation were terminated by mutual agreement, and the Brooklyn City is now doing all such maintenance work itself. The reduction in the maintenance of equipment compared to previous years is largely due to the newer and more modern type of cars.

The company, jointly with the Brooklyn-Manhattan Transit Corporation, has offered to supply supplemental bus service in Brooklyn on terms which it is believed are more advantageous to the general public than any other suggestion that has been laid before the Board of Estimate and Apportionment of the city of New York. The matter is still under advisement by the Board of Estimate and Apportionment.

Charges for injuries to persons and property were greater than the previous year, largely due to the increase in vehicular traffic. Every effort is being made to decrease the number of accidents, and beginning Aug. 1, 1926, a plan was put in effect under which all employees operating their cars for certain periods without an accident will receive a bonus. It is expected that this plan will prove of advantage to the employees, the public and the company.

INCOME STATEMENT OF THE BROOKLYN CITY RAILROAD

	Fiscal Year Ended June 30, 1926	Fiscal Year Ended June 30, 1925
Passenger revenue	$11,399,283	$11,363,196
Other car revenue	90	85
Total transportation revenue	$11,399,373	$11,363,281
Advertising and other privileges	96,666	96,000
Rent of land and buildings	126,526	146,292
Rent of tracks and terminals	54,527	56,590
Miscellaneous revenue	820	1,515
Total operating revenue	$11,677,915	$11,663,679
Operating Expenses:		
Maintenance—Way and structures	$1,327,310	$1,407,398
Equipment	1,216,427	1,441,866
Power	1,047,848	953,422
Operation of cars	4,219,640	4,143,844
Injuries to person and property	636,747	583,183
General and miscellaneous expenses	515,129	547,982
Total operating expenses	$8,963,104	$9,077,698
Net operating revenue	$2,714,810	$2,585,981
Taxes assignable to operation	768,707	775,363
Operating income	$1,946,103	$1,810,617
Non-operating income	92,854	101,940
Gross income	$2,038,958	$1,912,558
Income Deductions:		
Interest	$500,810	$282,688
Rent of cars and tracks	79,275	204,832
Other deductions from income	36,135	13,461
	$616,222	$500,982
Net income	$1,422,736	$1,411,576

Railway Operates Under New Control.—Control of the Valley Railways, Lemoyne, Pa., operating 44 miles of electric railway, particularly in Carlyle and Lemoyne, has passed to the Lehigh Power Securities Corporation. This has brought the Valley Railways into the group of properties under the supervision of the Electric Bond & Share Company, New York, N. Y.

Fate of Line Uncertain.—The possible purchase of the Windsor, Essex & Lake Shore Rapid Railway, Kingston, Ont., by Windsor and adjacent border cities is a question for early consideration. This situation was announced recently by Gordon D. Wickett, president, leaving for England to attend a meeting of the road's bondholders. He forecast a cessation of operations unless the line were taken over by the interested communities of Essex County. Mayor Mitchell of Windsor said he would not countenance purchase of the line until definite information was forthcoming with respect to its financial condition.

Hearing on Abandonment Deferred.—The hearing before the Public Service Commission on the application of the Hudson Valley Railway, Glens Falls, N. Y., for approval of a declaration of abandonment of its Lake George to Warrensburg trolley line and the line from Thomson to Greenwich has been adjourned to Oct. 19 at Albany. The date for a hearing on the matter was first set for Sept. 22 and then adjourned to Oct. 5.

Legal Notes

FEDERAL CIRCUIT COURT—*Employee Engaged in Interstate Commerce.*

The train of a railway entirely intrastate was carrying both interstate and intrastate shipments when it stopped to allow the electric locomotive to do some switching of empty coal cars. While this was being done, a trainman was injured. He was held to be engaged in interstate commerce. [Youngstown & O. R.R. vs. Halverstodt, 12 Federal (Second) Rep., 995.]

FEDERAL CIRCUIT COURT.—*Cars Used in Interstate Commerce Must Have Safety Coupler.*

A switchman in the yard of an electric interurban railway was injured while endeavoring to couple a car to an electric locomotive. The car was sometimes used in interstate commerce, but was empty at the time and was simply being switched from one to another track. The company was held responsible because the car was not equipped with automatic safety couplers as required by the federal safety appliance act. [Detroit U. R. vs. Craven, 13 Federal (Second) Rep., 352.]

FEDERAL CIRCUIT COURT—*City Ordinance Regulating Motor Vehicles, Passed Under Police Power, Must be Fair and for All Citizens Alike.*

The city of Hammond, Ind., passed an ordinance forbidding motor vehicle common carriers from operating over certain streets, but exempted any motor vehicles with whose owner the city already had a contract. A certain company came under this exemption. The ordinance was said to have been passed "to promote public safety and order and to diminish the congestion of vehicular travel within said city." The suit was brought by a bus company which was excluded under the law but had met all the requirements of the laws of the state of Indiana as to the operation of buses. The Court said there were several reasons why the ordinance should be declared invalid, but the one particularly cited was the exemption mentioned, saying: "Police regulations must be fair and reasonable for all citizens alike, so far as may be." The ordinance "permits some concerns to do the identical things from the doing of which" appellant is excluded. The city had the right to make a contract with one coach company and not with another, but if it had police powers of the extent claimed, it has no right to exercise them against one user of the street and not another. [Schappi Bus Lines, Inc. vs. City of Hammond, 11 Federal (Second) Rep., 940.]

INDIANA.—*Relocation of Tracks Because of Street Improvement.*

A railway company which originally had a 50 year franchise but changed it in 1921 to an indeterminate permit, was required by the State Highway Commission to relocate its tracks and change their grade on a highway which was being improved. The action of the State Highway Commission was upheld. [Hammond W. & E. C. Railway vs. State Highway Commission, 152 Northeast. Rep., 806.]

KENTUCKY.—*Local License Fee for Interstate Bus Upheld.*

A Kentucky law declares that auto transportation companies which accept licensing and regulation from the state need not take out a local license in those cities through which they operate. A license fee in a small city of from $25 to $50 a year per bus, depending on the size of the bus, was upheld as not constituting a burden on interstate commerce, in the case of an interstate bus company that had not taken out a state license. [Northern Kentucky Transportation Co., vs. City of Bellevue, 285 Southwest. Rep. 241.]

MASSACHUSETTS—*Automobile Stopped too Near Track.*

A driver stopped an automobile where it was certain to be hit by a passing electric car if the latter should sway a few inches further than the driver supposed it would. He was held guilty of contributory negligence as a matter of law. [Hurd vs. E. M. S. R. Co., 150 Northeast. Rep., 5.]

MISSOURI.—*High Degree of Care Required to Persons Standing on Step with Door Closed.*

A person tried to board a crowded car at a regular stopping place and stood on the step after the door was closed and the car had started. While in this position, he was hit by the girder of a bridge which the car was crossing. The company, under the humanitarian doctrine, was held responsible, if the conductor knew, or by using the highest degree of care could have known, that an intending passenger was still on the step and might be injured. [Amos vs. Fleming et al., 285 Southwest. Rep., 134.]

NEW HAMPSHIRE—*Interstate Bus Lines Must Not Accept Intrastate Business Unless They Conform to Regulations Laid Down for Motor Bus Common Carriers.*

All recent decisions on the regulation of interstate motor bus carriers by State Public Service Commissions are reviewed, and the terms of the New Hampshire statute on motor bus vehicles was held to apply to all intrastate business done by interstate motor buses. [Haselton vs. Interstate Stage Lines, 133 Atlantic Rep., 451.]

MICHIGAN—*Passenger Signaling Car While Standing Near Track Is Responsible If Injured.*

A person accustomed to travel on a certain interurban line signaled a car to stop at a point where stops are usually made on signal. Expecting the car to stop, the prospective passenger stood very near the track. No stop was made and he was injured. The court held him guilty of contributory negligence. [Devore vs. Rapid Railway, 209 Northwest. Rep., 111.]

NEW YORK—*Not Responsible When Car Hits Child Caught in Rail.*

A child crossing the track between blocks caught his foot in the rail and was struck by a car, whereas, if he had not caught his foot in the rail, probably he would not have been injured. There was no evidence that the rail was defective, and judgment for the plaintiff was reversed and a new trial ordered. [Madden vs. Chalmers, 214 New York Supp., 268.]

OHIO—*Authority to Issue Bus Certificates to Line Operating to State Border.*

A bus company applied for a certificate to operate from a city in Ohio near the state line to the state line between Ohio and Kentucky. The record showed that it had also applied for a route in Kentucky. It was held that the grant of the Ohio franchise was within the power of the municipality and not within the jurisdiction of the Public Utilities Commission. [Cannonball Transportation Co. vs. Public Utilities Commission of Ohio., 150 Northeast, Rep., 39.]

OHIO—*Grounds for Revocation of Bus Certificate of Public Convenience and Necessity.*

The Public Utilities Commission revoked a certificate of public convenience and necessity granted to a motorbus common carrier between Cleveland and Elyria for the following reasons among others: Omission of scheduled trips, operation without certain safety requirements, use of buses over irregular routes for special trips, and use of an outside bus for a schedule trip. The revocation was upheld on all points by the Supreme Court of Ohio, which declared, among other things, that the carrier, having brought itself clearly within the designation of a motor transportation company in order to receive the benefits of the provisions of the motor transportation act, cannot claim exemption therefrom on the theory that as to the so-called special trips, it was a "private contract carrier." [Solt et al. vs. Public Utilities Com. et al., 150 Northeast. Rep., 28.]

VIRGINIA—*Injury to Passenger Alighting from Car Stopped on Wrong Side of Street.*

A city ordinance of Richmond, Va., requires street cars to stop for the receipt and discharge of passengers only on the near side of intersecting streets. The director of public safety made an exception of the corner where the accident occurred, had instructed the company to stop on the far side and had erected a sign to that effect, but the Supreme Court of Appeals of Virginia held that he had exceeded his powers in doing so. The passenger alighting from the front platform of a car stopped at the corner in question was struck by an automobile, whose driver was unaware of the exception and did not expect passengers to be discharged at that point. The court differentiated the case from others where the company was held not liable when alighting passengers were struck by vehicles, because it declared the passenger had been put off at a wrong place. [Virginia Ry. & Power Co. vs. Taylor, 132 Southeast. Rep., 334.]

Personal Items

Charles R. Mahan Comptroller at Highwood

Charles R. Mahan, for the past four years auditor of the Chicago, North Shore & Milwaukee Railroad—the North Shore Line—has been appointed comptroller of this high-speed electrically operated railroad, with offices in Highwood, Ill. Mr. Mahan's appointment to this new office in the North Shore Line official organization comes as a reward for efficient service with transportation companies under the management of Samuel Insull and associates.

C. R. Mahan

It was while employed in the office of the auditor of disbursements of the Chicago, Rock Island & Pacific Railroad in 1905, where he had charge of the payroll department, that Mr. Mahan became acquainted with T. B. MacRae, now auditor of the Chicago Rapid Transit (elevated) Lines, who also was employed in the same office at that time. Mr. MacRae left this organization to become auditor of the Metropolitan West Side Elevated Railway, Chicago, about the same time that Mr. Mahan became chief clerk to the auditor of the Indiana Harbor Belt Railway, which was then in course of construction. The result of this early acquaintance was that on Sept. 1, 1907, Mr. Mahan was offered and accepted the position of chief clerk to Auditor MacRae on the Chicago elevated line.

In 1911, following consolidation of the elevated lines under the management of Samuel Insull and associates, Mr. Mahan was appointed assistant auditor. He retained this position until May 1, 1916, when he resigned to accept a position as accountant with the Interstate Commerce Commission in Washington, D. C. While engaged in this work he was promoted to accountant in charge of a field party on valuation work.

Returning to Chicago in 1921 to resume his position of assistant auditor of the Rapid Transit Lines, Mr. Mahan served in this capacity until Feb. 1, 1922, when he was appointed auditor of the North Shore Line. He was holding this position with the North Shore Line at the time of his recent promotion.

Changes in Personnel at Fitchburg

Stockholders of the Fitchburg & Leominster Street Railway, Fitchburg, Mass., met on Sept. 28 and initiated steps to reorganize the company. Wesley W. Sargent, president and general manager, resigned. Other resignations included Herbert I. Wallace as vice-president and William E. Putney as director. The others were also directors. This left three vacancies on the board of directors, places filled by the election of Albert C. Brown, George R. Wallace, Jr., and Robert S. Parks, all of whom are residents of Fitchburg.

Louis E. Cushing, Lowell, Mass., general manager of the Lowell & Fitchburg Street Railway for the last eighteen years, will succeed Wesley W. Sargent as general manager of the Fitchburg & Leominster company. Mr. Cushing enters immediately on his new work.

Other directors of the organization are Harry G. Townsend, Emerson W. Baker, Charles F. Baker and Thomas H. Shea. Charles F. Baker is clerk of the company. A new president and vice-president will be elected.

Major Mathews Resigns

Major Philip Mathews, chief executive officer New York Transit Commission, has resigned, effective Sept. 30, to accept the post of Director of the Governmental Research Bureau at Pittsburgh, Pa. Major Mathews took over the transit assignment on May 15, 1924, when Lincoln C. Andrews resigned to become assistant secretary of the treasury in charge of prohibition enforcement. Mr. Mathews has conducted many public hearings for the commission. In addition to the many transportation problems he helped to solve he has had general charge of all administrative affairs outside the offices of the secretary, legal advisers, and consulting engineer. Major Mathews has held many high army posts.

J. F. Greenawalt, publicity manager of the Mountain States Telephone & Telegraph Company, was recently elected president of the Colorado Public Service Association, Denver, Col. H. S. Robinson was elected first vice-president and V. L. Board second vice-president. O. A. Weller will continue to serve as secretary of both associations.

Frank Kley, for some time assistant superintendent of the Monongahela West Penn Public Service Company in Elkins, W. Va., has been transferred to Grafton, with a promotion to district superintendent. Mr. Kley has been connected with the electric interests at Elkins for more than nine years, going into the service of what was then the Elkins Power Company in 1917. He has continued his services with the organization since that time. Mr. Kley was graduated from high school in 1917.

L. C. Torrey Appointed Secretary and Treasurer in Chicago

Lincoln C. Torrey, an authority on transportation finances, has been appointed secretary and treasurer of the Chicago, North Shore & Milwaukee Railroad—the North Shore Line—with offices in Chicago, Ill. His promotion to this position of trust at the age of 36 years is an outstanding example of rapid advancement in the public service field. In addition to his duties with the North Shore Line, Mr. Torrey is assistant secretary and assistant treasurer of the Chicago Rapid Transit (elevated) Lines, also under the management of Samuel Insull and associates, and treasurer of the Niles Center Transit Company. He entered the service of the North Shore Line on Jan. 1, 1921, as engineer auditor and rose rapidly to higher positions of responsibility with this company. He was promoted to valuation engineer in 1922 and became assistant treasurer in 1923. In March, 1925, he was given the double duties of assistant secretary and assistant treasurer, which offices he was holding at the time of his recent promotion.

L. C. Torrey

Mr. Torrey was born at Byfield, Mass., in 1890. He was graduated in 1912 from Harvard, where he specialized in engineering. From 1912 to 1914 he served with the engineer corps of the Pennsylvania Railroad, and during the following two years was pilot engineer on valuation of the same line as ordered by the Interstate Commerce Commission. He was cost engineer with the Goodyear Tire & Rubber Company from 1916 to 1920.

George R. Apfel has been promoted to assistant treasurer and Arthur E. Kullas assistant secretary, succeeding Mr. Torrey in these positions. George G. Green succeeds Mr. Apfel as cashier and Lurton F. Gottliebe has been appointed assistant cashier.

Obituary

A. D. McPherson

A. D. McPherson, auditor of the Pittsburgh Railways, Pittsburgh, Pa., dropped dead on Sept. 24 while crossing Smithfield Street at Fifth Avenue, Pittsburgh. Physicians ascribed his sudden death to heart disease. The late official had been identified with Pittsburgh utilities since 1899, when he entered the employ of the Pittsburgh Traction Company as a clerk. When the Pittsburgh Railways was organized, following the consolidation of the city's traction interests, he was made chief clerk of traffic receipts. In 1924 he assumed the duties of auditor. Besides his railway affiliation he was a member of the Chamber of Commerce.

Mr. McPherson was born in Bellevue. He attended the borough schools and the Allegheny High School.

Alfred Craven

Alfred Craven, well-known engineer, who had a large part in the construction of the subways of New York City, N. Y., died Sept. 30 at Pleasantville, N. Y., where he had been living since his retirement six years ago.

Mr. Graven was chief engineer of the old Rapid Transit Commission, under whose administration the dual subway rapid transit system was planned and built. His achievement in digging the subway system is ranked by engineers with that of the construction of the Panama Canal, and he was often referred to as "the General Goethals of New York City."

He started in the service of the city in 1884, after making a reputation as a civil and mining engineer in California. In 1900, when the first New York subway work was begun, Mr. Craven was appointed division engineer of the Rapid Transit Commission, and was in charge of that part of the construction from Park Avenue and 41st Street to Broadway and 104th Street.

Four years later he was made deputy chief engineer of the Rapid Transit Commission. In 1907 he was appointed deputy engineer of the Subway Commission. He was made acting chief engineer of the same commission in 1910 and a year later chief engineer, in which post he served until 1916, when he became consulting engineer to the Public Service Commission and its successor, the Transit Commission. He retired as consulting engineer in 1920.

Mr. Craven was born in Bound Brook, N. J., Sept. 16, 1846, the son of Rear Admiral T. T. Craven. He was graduated from the Naval Academy in 1867.

Frank Cook, St. Louis district sales manager of the Ohio Brass Company, Mansfield, Ohio, one of the most widely and popularly known salesmen in the electric railway and power fields, died suddenly in Chicago, Sept. 30. Mr. Cook had been ailing for some time, but his condition had not been considered serious. In fact, he had recently seemed much improved. He will be mourned by a host of friends and leaves a place which the Ohio Brass Company feels can never be filled.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

National Electrical Manufacturers' Association

Gerard Swope Will Head New Organization, Made Up of 270 Leading Companies

Announcement was made recently of the creation of the National Electrical Manufacturers' Association, an organization consisting of 270 leading electrical manufacturers with a gross annual business exceeding $1,500,000,000. The new organization, with Gerard Swope, president of the General Electric Company, as president, was formed by the merger of the Electric Power Club, the Associated Manufacturers of Electrical Supplies and the Electrical Manufacturers' Council. J. W. Perry, vice-president of the Johns-Manville Company, Inc., was made treasurer.

The general purpose of the new association is to advance the art of manufacturing adequate and reliable electrical equipment and to standardize electrical apparatus, which, it was said, will ultimately mean lower costs and lower selling prices to the public. The association will co-operate with the Department of Commerce in its constructive work, both in standardization and simplification.

Specifically, the objects of the new association, according to its constitution, are to further the interests of the makers of electrical apparatus and supplies in manufacturing, engineering, safety, transportation and other industrial problems; to promote the standardization of electrical apparatus and supplies; to collect and disseminate information of value to its members or to the public; to appear for its members before legislative committees, governmental bureaus and other bodies in regard to matters affecting the industry, and to promote a spirit of co-operation among its members.

Among the charter members were Allis-Chalmers Manufacturing Company, Anaconda Copper Company, Crocker - Wheeler Company, Crouse-Hinds Company, Cutler-Hammer Manufacturing Company, Electric Storage Battery Company, General Electric Company, Landers, Frary & Clark, National Carbon Company, Inc., National Metal Molding Company, Radio Corporation of America, Reliance Electric & Engineering Company, Robbins & Myers Company, Stromberg-Carlson Telephone Company, Western Electric Company and Westinghouse Electric & Manufacturing Company.

New Bus Engines Will Be Exhibited

A six-cylinder, light, high-speed bus engine of new design will be exhibited by the Waukesha Motor Company, Waukesha, Wis., at the American Electric Railway Association convention in Cleveland. The engine has many features that are of interest, such as the Ricardo head, girder type crankcase, truncated cylinders, and a dynamic thermostat.

All of these features are embodied in Waukesha heavy-duty bus engines such as are being used by the International Harvester, Wilcox, Versare and Fageol companies.

New Italian Electric Locomotives

Ten electric locomotives of a new type have recently been completed by the Breda Company of Milan for use on the Rome-Tivoli-Avezzano Railroad. The engines, which have a wheelbase of 38 ft., are equipped with two motors which drive through gearing a countershaft connected to the driving axles by coupling rods. They are designed to be operated by 10,000-volt, three-phase, 45-cycle a.c., which is stepped down to a working tension of 1,600 volts. The motors are so arranged that either eight or twelve poles may be utilized, so that they may either be run in series or parallel.

Authority on Strength of Materials Joins Haskelite Staff

Prof. O. H. Basquin, who for 25 years has been on the staff at Northwestern University, has resigned from the faculty to take charge of the engineering department of the Haskelite Manufacturing Corporation with headquarters in Chicago. He has been acting as consulting engineer for this company since its organization.

Professor Basquin's principal interest in his own graduate work and in his teaching and research work has been in the field of strength of materials. One subject that attracted his attention particularly was the so-called fatigue phenomena of metals. When the National Research Council appointed an advisory committee on this subject toward the close of the war, Professor Basquin was made a member of the committee, the work of which is now drawing to a close.

The experience of Professor Basquin will peculiarly fit him for the problems he faces in connection with the production and application of Haskelite, the structural plywood, and Plymetl, its steel-faced companion. The Haskelite products are used for a wide variety of applications where known physical properties are the first requisites. The process of production in the Haskelite plant must, therefore, be carefully safeguarded to insure absolute uniformity in strength, weight and other properties. The molding of Haskelite and Plymetl for bus and street car roofs and other uses introduces problems in manufacture that require very careful study and frequently the design of special equipment. Professor Basquin will devote considerable time and effort to this phase of the company's work.

Important Tests Conducted on Paving Brick

To settle the moot question as to whether brick less than 4 in. in thickness may properly be used in the construction of brick pavements, a comprehensive investigation of the subject has been made on sections of pavement built of brick of different thicknesses and in the form of a circular test track at Arlington, Va. This investigation has been carried on by the Bureau of Public Roads of the United States Department of Agriculture, and the whole subject was covered in a thoroughgoing fashion, not only through service tests on the track itself, under accelerated traffic conditions, but also by means of a series of laboratory tests on the bricks to determine their quality. Several plants manufacturing brick of less than 3-in. thickness have also been visited to determine the attitude of the industry toward the use of a thinner brick and to ascertain if their manufacture presents any particular difficulties.

A reduction of thickness below the usual 4-in. depth would give a resulting economy in the construction of brick surfaces. Several parts of the investigation have now been completed and an analysis of the data obtained has been published as a series of conclusions in the issue of *Public Roads* for September. The report was made by L. W. Teller, engineer of tests, and J. T. Pauls, associate highway engineer, United States Bureau of Public Roads.

Among the more important conclusions reached by the engineers were the following: (1) Brick 2½ in. thick, of the quality used in the Arlington traffic tests, when properly supported, will prove satisfactory for pavements carrying the heavier types of traffic; (2) brick 2 in. thick, when properly supported and of the quality used in the tests, will be adequate for pavements on streets carrying the lighter types of traffic; (3) a bedding course of plain sand is more effective in reducing breakage of brick than a cement-sand bedding course, the breakage being much less on the former than the latter. The depth of the sand bedding course should not greatly exceed ¾ in. Increasing the depth tends to produce roughness in the pavement; (4) cobbling of the brick is greatly increased as the spacing between bricks is increased; (5) the use of excessive quantities of asphalt filler is a common and serious fault in construction, unnecessarily increasing the cost and resulting in a condition which impairs both the appearance and the serviceability of the pavement; (6) base construction of other than the rigid type may in many cases prove entirely satisfactory; macadam bases and those constructed of certain types of natural earth appear to be suitable when the local conditions are such that these types of construction maintain their stability throughout the year; (7) no difference in the base construction is necessary for the different thicknesses of brick.

On the basis of 1925 shipments of paving brick, the use of the 2½-in. brick would indicate a saving to the country of more than $1,500,000 annually.

New Yellow Buses for International Railway

Five new gas-electric single-deck buses have been received by the International Railway of Buffalo, N. Y., for use over the new Kenmore-Tonawanda route on Military Road. The units were built by the Yellow Truck & Coach Manufacturing Company of Chicago, Ill. They have a seated passenger capacity of 33. They are of the special type which has been developed for Mitten Management for use in Philadelphia.

Pneumatic tires and dual wheels on the rear are provided on these new buses. The body design is of the city service type, to accommodate the maximum number of seated passengers. Half-hour headways will be maintained in both directions over the Military Road, with fifteen-minute service during the morning and evening rush hours.

These Gas-Electric Buses Will Be Used in Interurban Service Out of Buffalo

American Locomotive Will Maintain Dividend Rate

No thought is being entertained by the board of directors of the American Locomotive Company of reducing the dividend rate, according to William H. Woodin, chairman of the board. He states that the $8 annual dividend virtually is being earned at the present time. He added that the American Car & Foundry Company, of which he is president, is also earning its annual dividend. He believes that the outlook for locomotive and equipment business is somewhat better now because of the heavy traffic which the transportation companies are handling.

Seattle Finds Way to Get Its New Cars

Members of the utilities committee of the City Council of Seattle, Wash., now believe that a way is clear to issue $1,875,000 of bonds for the purchase of eighty new street cars. The proposal to issue the bonds was questioned by Comptroller Harry W. Carroll after the passage of the ordinance. He pointed out that as there has been a decrease in patronage on the street cars there could be no extensions. As a result of views expressed by five Councilmen at the recent committee meeting, it was predicted that a resolution would be introduced in the Council directing Comptroller Carroll to issue the bonds.

T. J. L. Kennedy, Corporation Counsel, holds that if the bonds are issued for extensions to the railway system they would be legal, but if they were for replacements, they would be illegal as the state law provides that replacements of a municipal utility must be met from the revenues. Councilmen pointed out that since Mr. Kennedy had left it up to them to decide whether the bonds were for replacements or extensions, there was really no new decision to make, as the ordinance already passed said the bonds were for extensions. Therefore, the way was clear for them to direct Comptroller Carroll to issue the bonds. The contract for the new cars has been let to the St. Louis Car Company.

Duco for Brush Application Now Available

For convenience in finishing sash, interior trim and in other places where spray application does not give maximum efficiency, as well as for all finishing in shops not equipped with pneumatic spray apparatus, Duco finish for application by hand brushing has recently been placed on the market by the chemical products division of E. I. du Pont de Nemours & Company, Parlin, N. J. This new type of Duco can be easily brushed on in the same way as varnish, paint or enamel. It dries dust free in a half hour and the second coat can be applied after three hours. The finish obtained possesses a hard, durable gloss, requiring no polish, although it can be rubbed to a brilliant luster if desired. The manufacturer states that it has been successfully used for refinishing cars already in service, the Duco being applied directly over the old paint or varnish, either in interior or exterior, and on either wood or metal.

Time saving is an important element in the use of Duco. It is possible to complete the finish of an entire car in one day under rush-job conditions, this representing a real saving in the time that the car is out of service and also in freeing the paint shop for other jobs. It is claimed that the new brush Duco possesses the same durable finish that has characterized Duco heretofore applied by the spraying process.

The finish may be used effectively on street cars as well as buses. The Du Pont Company states that Duco finish has been widely adopted as standard in the automotive industry, including many bus manufacturers, and is being used to an increasing extent on both steam and electric railways.

Mack Sales to Electric Railways

Announcement has been made by the International Motor Company, New York, N. Y., of a number of sales of Mack buses to electric railway companies in recent weeks. Among the orders listed were the following:

Tri-City Railway, Davenport, Iowa, two 25-passenger gas-electric, city type.

Iowa Southern Utilities Company, three 25-passenger city type (for operation by the Ottumwa Street Railway).

Topeka Railways, Topeka, Kan., two 25-passenger city type.

Twin City Motor Bus Company, one 29-passenger city type.

Information for Users of Electric Steel Castings

In the belief that there is a woeful lack of knowledge concerning the manufacturing processes involved in the production of electric furnace steel castings on the part of the users of these castings the Lebanon Steel Foundry, Lebanon, Pa., has published a very interesting set of bulletins on the subject. Twelve of these bulletins have now been issued, and it is planned to carry the series still further in coming months.

Beginning with bulletin No. 1, entitled "The Rise of the Steel Casting Industry," the series treats on such subjects as physical characteristics of electric furnace steel castings, qualities and uses of molding sand, cores, patterns, pattern mounting, various uses of electric steel castings, etc. The material is well illustrated throughout and has been couched in language which is comprehensible to the man who is only indirectly interested in steel treatment.

The bulletins are intended to be of an educational rather than an advertising nature, and it is along similar lines that the series will be continued in the future. The Lebanon company will be very glad to furnish all of the bulletins to date to any one interested in having them. Bulletins to be issued in the future will also be mailed to those who desire them.

Metal, Coal and Material Prices

Metals—New York	Sept. 28, 1926
Copper, electrolytic, cents pr lb	14.275
Copper wire, cents per lb	16.25
Lead, cents per lb	8.725
Zinc, cents per lb	7 72
Tin, Straits, cents per lb	71.00
Bituminous coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.875
Somerset mine run, Boston, net tons	2.075
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.525
Central, Ill., screenings, Chicago, net tons	1.40
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$5.75
Weatherproof wire base, N. Y., cents per lb	17.75
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb	11.4
White lead in oil (100-lb. keg), N. Y., cents per lb	15.25
Turpentine (bbl. lots), N. Y., per gal	$0.945

Sash Locks by O. M. Edwards

Sash locks on the 50 street cars being built by the Osgood-Bradley Car Company of Worcester, Mass., for the Pittsburgh Railways are being furnished by the O. M. Edwards Company of Syracuse, N. Y., instead of by the Dayton Manufacturing Company. This item was incorrectly reported in the issue of ELECTRIC RAILWAY JOURNAL for Sept. 4.

Rolling Stock

Chicago, Ill.—Nearly one-third of the 100 new cars ordered last May by the Chicago Surface Lines were delivered on Sept. 15 and have been placed in service. The remainder of the cars, the total cost of which is more than $1,600,000, are expected to be delivered within the next month. With the additional equipment the company will have 445 new cars, all of which were obtained in a little more than three years. During that time there has been an increase in service of 12,000,000 annual car-miles and an increase in riding of approximately 83,000,000 revenue passengers.

Richmond, Va.—Fifteen new buses were recently ordered by the Virginia Electric & Power Company to augment its bus fleet, which now numbers 64. The new equipment will be used on several extensions and new routes which are being planned by the railway. Thirteen of these buses have been purchased from the White Company of Cleveland, Ohio. Eight of these are model 50-B, seating 29 passengers, and five are of the smaller model 53, seating 21 passengers. The bodies for the smaller type chassis are being built by the Bender Body Company of Cleveland, Ohio. The two buses not being furnished by the White Company were ordered from the Yellow Truck & Coach Manufacturing Company, Chicago, Ill.

Community Traction Company, Toledo, Ohio, purchased twelve 29-passenger city type buses from the International Motor Company. The Mack buses will be operated on Front Street, at a four-minute headway. Smaller buses are being used for feeder service to the main bus lines operated by the company. It is possible that additional routes will be started in the near future.

Track and Line

Virginia Electric & Power Company, Richmond, Va., intends to lay out about 10 miles of new trackage for the electric car service. On the Belmont line a double track will be placed from Belmont and Cary Streets to Granite Street, adjacent to William Byrd Park. An extension will be laid on Broad Street from Sheppard Street to the city limits. In the Grove Avenue "Crest" section a line will be run on Lafayette Street from Broad to Grove Avenues, connecting with the existing Westhampton line. The Highland Park line will be extended along First Avenue to Highland Street, then to Patrick and to Meadowbridge Road. The Hull Street line, in South Richmond, will be run from the Broad Rock Road to 43d Street.

Worcester Consolidated Street Railway, Worcester, Mass., is relocating and changing the grade of 3,700 ft. of track in the town of Boylston at an estimated cost of $13,500. Also the grade of track is being changed on 2,900 ft. of track on Merriam Avenue, Leominster, at an estimated cost of $5,000. The cost of relocating and reconstruction of 475 ft. of track on Canal Street, Millbury, is estimated at $3,600. This will involve the use of 10 tons of 7-in. girder rail and a new special curve. Six new crossing frogs have been installed at Barbers Crossing at an estimated cost of $8,000.

Trade Notes

Ohio Brass Company, Mansfield, Ohio, will pay an extra dividend of $1 a share on the common, in addition to the regular quarterly payment of $1 a share, according to a recent decision of the board of directors, it was reported.

Central Alloy Steel Corporation is the new name under which the Central Steel Company of Massillon, Ohio, and the United Alloy Steel Corporation of Canton, Ohio, have been consolidated. The two plants in Massillon and Canton will continue to be operated as divisions of the central organization.

New Advertising Literature

Ingersoll-Rand Company, New York, N. Y., has published an interesting little booklet entitled "Clearing the Way for the Comforts of Life." It embraces a brief narrative of the development of American railway motive power from its earliest stage and leading up to the recent advent of the oil-electric locomotive. A glimpse is given of the economies already effected by this new type of locomotive and of its potential effect upon the future of railroading in America.

Reo Motor Car Company, Lansing, Mich., has issued a booklet describing its several types of buses. Illustrations and data on the chair coach for intercity and interurban service, the pay-enter bus for city service and the pay-enter Grand for combination city and suburban service appear in the booklet, as well as a discussion of the relative advantages of large and small capacity buses.

General Electric Company, Schenectady, N. Y., has issued bulletin GEA-504, entitled "Electrification of the Detroit Tunnel Lines of the Michigan Central R.R." Pictures and descriptions of the operation of the electrified division and of the electrical equipment are included.

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2. Release air brakes.
3. Then try to set hand brake!

Will it hold?

The Peacock Staffless will!

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THE largest stringers for railway projects are usually Douglas Fir. No other wood can produce timbers of such sizes and lengths in the necessary grades and with anywhere near the strength of Douglas Fir.

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Ten-foot Douglas Fir logs are sometimes brought to the mills, while six-foot logs are often handled. The largest sizes of stringers can be furnished on short notice. Douglas Fir can be supplied in all of the A.R.E.A. structural grade combinations. Specify Douglas Fir for every railway purpose.

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The answer to which is that this isn't a lowly job when viewed through the kaffir's eyes.

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Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
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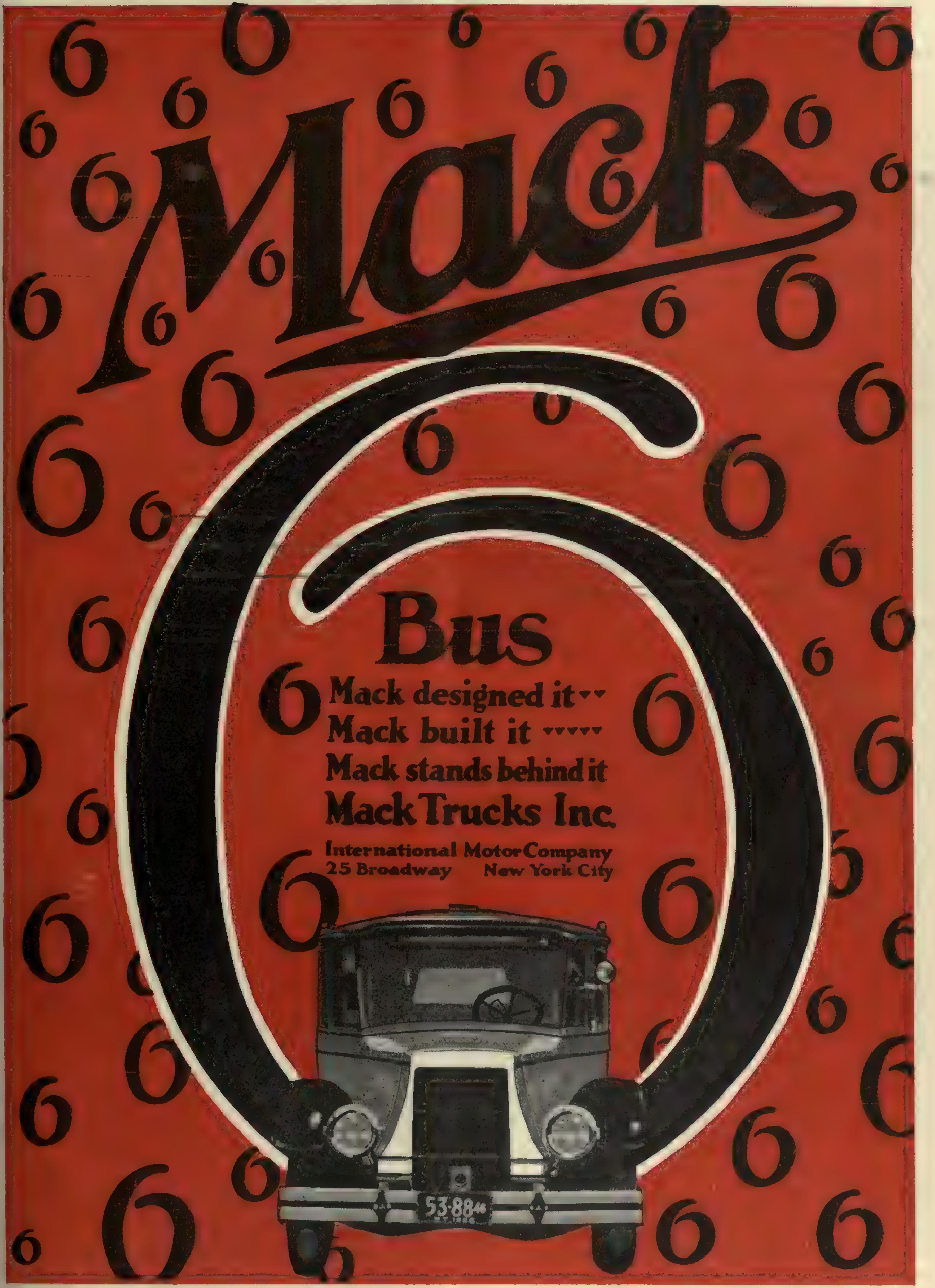

Mack

6

Bus

Mack designed it
Mack built it
Mack stands behind it

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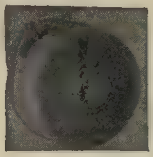

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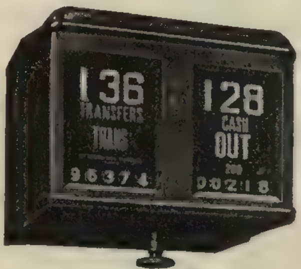

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Wharton trackwork, in which the famous Tisco Manganese Steel has been used, will be found on the leading railways of the country.

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So much so, in fact, that it is used for nitric acid containers, turbine buckets, blades, coal mine equipment, marine hardware, and sporting goods.

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have proved their claims to superiority.
Another ad will appear next week.
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Better Quality Seats For Cars and Buses
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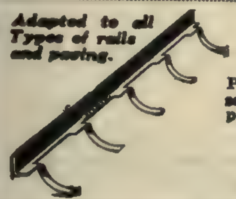
The Electric Railway Improvement Co.
Cleveland, Ohio



Adapted to all Types of rails and paving.
GODWIN
Steel Paving Guards
Proven by service to economically prevent seepage and disintegration of street railway paving.
Write for Illustrated Catalog No. 26
W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

The Wrong Product to Buy by "Eye"!

Varnished insulations have a way of looking much alike. Their differences don't show up sometimes for a long time . . . but they *do* show up, and often in a way that is no compliment to the people behind the job.

When tempted to consider Acme Varnished Insulations solely on price, remember this:

Pure vegetable oil varnish is used. It is made in our own factory, under scientific control and applied in specially designed towers, under *accurately regulated heat.* The result is a smooth, tough, flexible film.

The Cambrics are made from selected cotton cloth, woven from long-staple yarn. They are then given a special finish which insures remarkable tensile and tearing strengths and uniform thickness.

The Silks are the finest Japanese grades obtainable—of great smoothness and tensile strength.

For the Papers, raw stock is chosen especially for its fitness for varnished insulations. It is UNIFORMLY everything that it should be.

Acme Varnished Insulations pass all standard tests . . . with plenty of margin.

Think twice when considering Acme—the first time about the QUALITY.

May we send you Catalog 3J telling about Acme Wire Products?

ACME WIRE PRODUCTS

THE ACME WIRE CO.
Main Office and Plant, NEW HAVEN, CONN.

New York, 52 Vanderbilt Ave.
Boston, 80 Federal St.
Chicago, 427 West Erie St.
Cleveland, Guardian Bldg.

Loan Value and Space Buying

BUSINESS concerns seeking credit at regular intervals submit detailed audits by disinterested public accountants. The banker making the loan demands it.

These audits instantly disclose the exact financial condition of the business. They show the true value of inventories and assets; costs of operation; profits and loss. Such an audit creates confidence and is considered a necessity in banking operations.

The A. B. C. audit serves a similar purpose in advertising. A publisher or his representative in selling space presents his latest A. B. C. report. This shows quantity, territory of distribution, methods by which circulation was secured, and many other details necessary for the intelligent purchase of advertising space.

A study of the A. B. C. audit brings out every detail of circulation data, and immediately establishes confidence between the Buyer and Seller of Space.

For publishers to sell and advertisers to buy on the basis of A. B. C. reports is nothing more than putting efficient Business Methods into Advertising.

Let the Electric Railway Journal submit their latest A. B. C. report before you make your next advertising contract.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches	$4.50 an inch
4 to 7 inches	4.30 an inch
8 to 14 inches	4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

ERJ

POSITIONS VACANT

AN exceptional opportunity is offered to an exceptional, rapid thinking, full of life, experienced railway superintendent, who knows the business in all its branches. Must be fully capable of directing any part of the business. Give full information as to experience, former employer and salary received. Evanston Railway Co., Evanston, Ill.

POSITIONS WANTED

OPERATING executive, now employed desires change, twenty-five years' practical electric railway transportation experience, familiar with making schedules, public relations, labor and traffic problems, and requirements for successful and efficient operation. PW-935, Electric Railway Journal, 7 So. Dearborn Street, Chicago, Ill.

Why Save It?

Equipment you have replaced, or for which you have no further use can probably be sold at a good price now. Later it may not be worth as much.

Weed out equipment and let a

"Searchlight" Ad

help you sell it promptly

G-9

ELECTRIC SHOVEL

1½-yd. Vulcan, standard gage, 600 v., d.c. shovel. In first class condition. Must be moved at once so only $1,700.00 will buy it.

ZELNICKER IN ST. LOUIS

Rails Equipment Steel Piling, etc.

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built

West. 508 or G.E. 264 Motors

Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

SAVE 30% TO 50% ON

RAILS-LOCOMOTIVES-CARS

Economy—Service
Quality—Reliability

HYMAN-MICHAELS COMPANY

Peoples Gas Bldg., Chicago

ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

FOR SALE

Standard Birney Safety Cars

2—Double end, 34 capacity, G. E. motors and lightning arresters, West. air brakes, Safety car devices, Economy meters, International registers, 42-in. gage.

The Denver & So. Platte Ry. Co.

210 Tramway Bldg., Denver, Colo.

FOR SALE

10 Practically new specially constructed

BIRNEY CARS

Wgt. 10-ton, type of motor 2 GE 247-A, double doors, equipped for double end operation and all safety devices.

IRVING S. VAN LOAN CORPORATION

1750 Broadway, New York City

Specialists in street cars or any part of a street car.

Illustrated bulletin supplied on request.

Today's Prices Are Highest

Let "Searchlight" Help You

The quicker idle equipment is sold, the higher the selling price it can demand—today's prices are always highest because—

Equipment permitted to remain unused depreciates rapidly and occupies valuable space. Every day of idleness brings down the possible selling price.

"Searchlight" Locates Quick Buyers

The wise owner of idle equipment promptly informs the field of his desire to sell through an advertisement in the Searchlight Section, where he knows that those who might need what he has will be most likely to look first.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Rear
Clark Equipment Co.

Axles, Steel
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.

Babbitt Metal
Johnson & Co., J. R.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Brill Co., The J. G.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co., Inc.

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Brill Co., The J. G.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Cambric Yellow and Black Varnish
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co. Inc.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Gray Iron and Steel
American Bridge Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Cement
N. Amer. Cement Corp.

Cement Accelerator
N. Amer. Cement Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse Elec. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying and Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co., The
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register, etc.
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoists & Lifts
Buda Co., The
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Foundations
International Steel Tie Co.

Crossings, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals. (See Signal Systems, Highway Crossing)

Crossings, Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Denver & So. Platte Ry. Co.
Elec. Equipment Co.
Hyman-Michaels Co.
Van Loan Corp., Irving S.
Zelnicker in St. Louis

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish Service, Edward P.

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
National Pneumatic Co.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Ears
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Track-work Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Byllesby Co., H. M.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil and Steam
Westinghouse E. & M. Co.

Engines, Gasoline
Continental Motors Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Perey Mfg. Co.

Fare Registers
Elec. Service Supplies Co.

Fences, Woven Wire and Fence Posts
Acme Wire Co., The
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Elec. Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Furnaces, Electric
American Bridge Co.

Fuses and Fuse Boxes
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.
Westinghouse E. & M. Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
Brill Co., The J. G.

Gear Cases
Chillingworth Mfg. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Elec. Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinding Bricks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

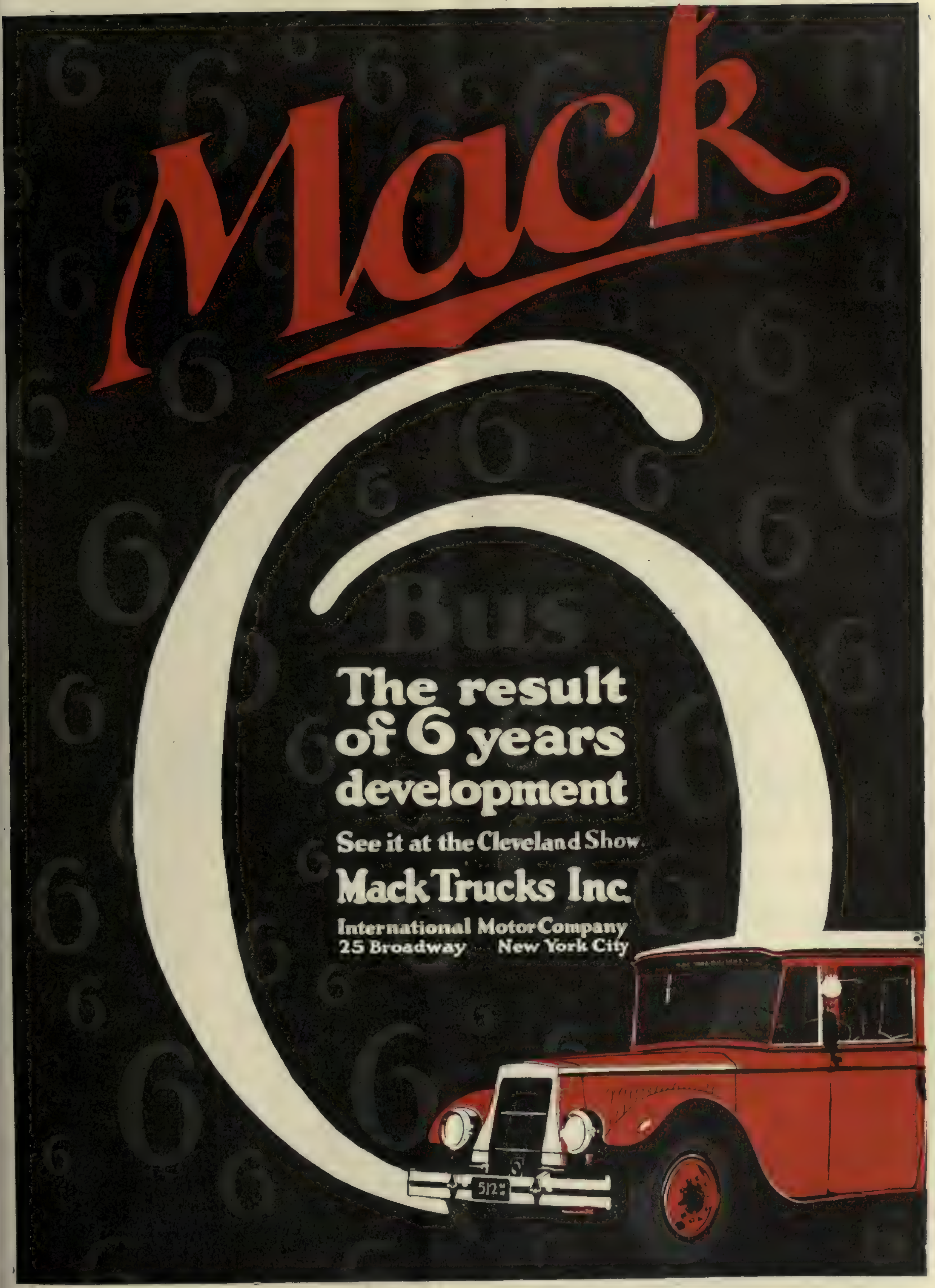
Harps, Trolley
Elec. Service Supplies Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

(Continued on page 32)


Mack
Bus
The result of 6 years development
See it at the Cleveland Show
Mack Trucks Inc.
International Motor Company
25 Broadway New York City
512

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car, Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Track-work Co.
Una Welding & Bonding Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Trac. Br. Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
Anchor Webbing Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
U. S. Rubber Co.
Westinghouse E. & M. Co.

Insulating Machinery
Amer. Ins. Machinery Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish and Insulating Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
U. S. Rubber Co.
Westinghouse E. & M. Co.

Insulation Slot
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators (See also Line Materials)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars, Passenger, Freight, Express, etc.)

Jacks (See also Hoists and Lifts
Buda Co., The
Elec. Service Supplies Co.
National Ry. Appliance Co.

Journal Boxes
Brill Co., The J. G.

Lamps, Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Corp.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
General Electric Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Texas Company
Universal Lubricating Co.

Lubricants, Oil and Grease
Texas Company
Universal Lubricating Co.

Lumber (See Poles, Ties, etc.)

Machinery, Insulating
American Insulating Machinery Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Mica
Mica Insulator Co.

Motor and Generator Sets
General Electric Co.

Motor Buses (See Buses, Motor)

Motorman's Seats
Brill Co., The J. G.
Elec. Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Nuts and Bolts
Hubbard & Co.

Oils (See Lubricants)

Packing
U. S. Rubber Co.
Westinghouse Tr. Brake Co.

Paints and Varnishes (Insulating)
Dixon Crucible Co., Joseph
Electric Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Paving Guards, Steel
W. S. Godwin Co., Inc.

Pickups, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe
National Tube Co.

Pipe Fittings
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.
Nat'l Ry. Appliance Co.

Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles and Ties Treated
Bell Lumber Co.

Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.
Naugle Pole & Tie Co.

Poles, Trolley
Bell Lumber Co.
Elec. Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Tube Co.

Portable Grinders
Buda Co., The

Potheads
Okonite Co.
Okonite-Callender Cable Co. Inc.

Power Houses
American Bridge Co.

Power Saving Devices
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Tr. Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Ludlum Steel Co.

Rail Joints—Welded
Lorain Steel Co.
Metal & Thermit Corp.

Rail Welding
Metal & Thermit Corp.
Railway Track-work Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Electric Equipment Co.
Ludlum Steel Co.

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Switches, Track (See Track Special Work)

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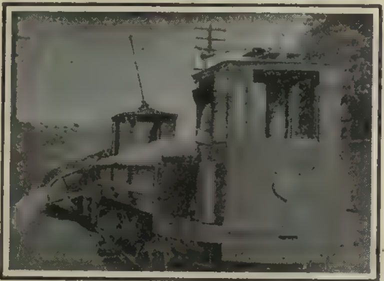

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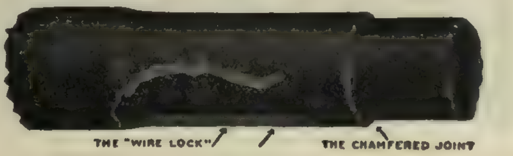

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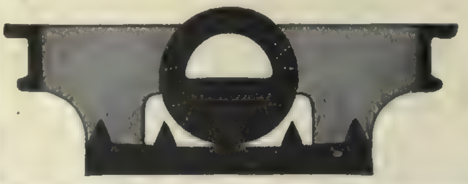

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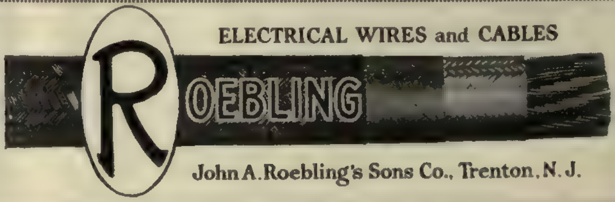

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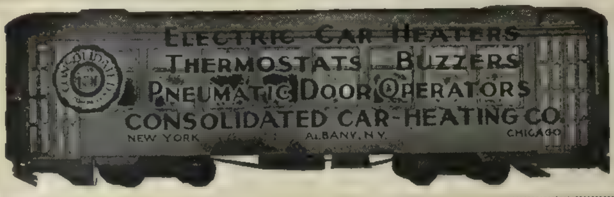

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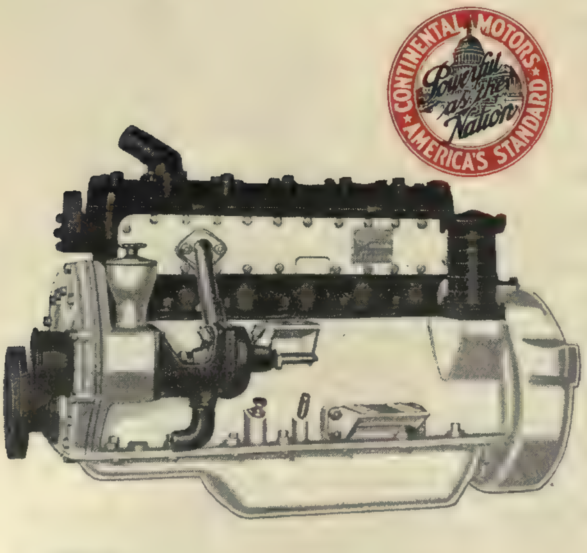

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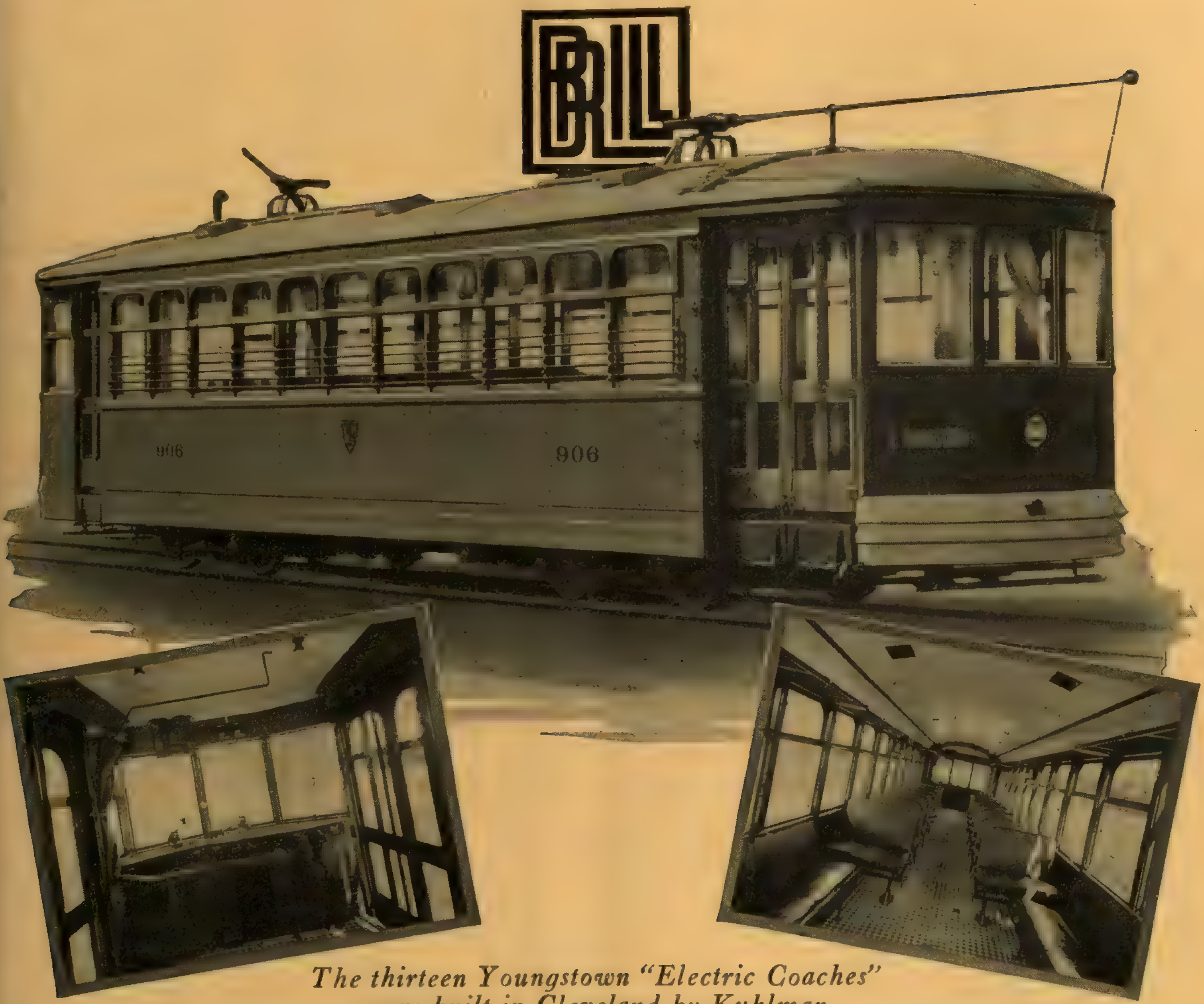

The thirteen Youngstown "Electric Coaches" were built in Cleveland by Kuhlman

Modern Cars

"the higher standard of appearance and comfort"

Deep spring leather upholstered seats, rubber tile floor covering, dome lighting, genuine mahogany finish and equipment cabinets may be unusual appointments, but the Youngstown Municipal Railway in its thirteen "electric coaches" recognizes the importance of their use to meet the demand of the American public for a higher standard of appearance and comfort. With such inviting cars there is less incentive for the use of the private automobile.

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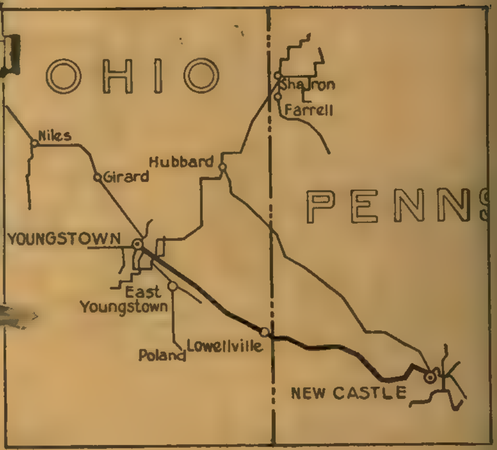

Again proper rolling stock has been fitted to local conditions. As to the earning power of these modern cars, let the figures speak. One-man operation was a success from the start, and the public has been well pleased.

Light-weight cars have cut costs on the Penn-Ohio System

By replacing 54,000-lb. cars with modern one-man cars on its Youngstown-New Castle line, the Pennsylvania-Ohio Electric Company has effected savings that amount to a gross return of more than 40% on the new-car investment—sufficient to pay for the cars in three years.

The new 37,000-lb. cars, which are G-E equipped, consume 2.76 kw. hr. per car-mile at the car as compared with 3.83 kw. hr. for the old cars—a 28% reduction. They have made a total reduction of 30% in the accounts they primarily affect: Equipment Maintenance, Power, and Platform Expense. Their modern equipment includes GE-265 Motors, K-35 Control, and CP-27 Compressors.

Improved car design can do much to attract more patronage and promote public good-will. The motive power must keep up schedule speeds and keep down maintenance costs. Bear in mind the success of G-E Car Equipment on many roads that are modernizing, and let G-E equip your lines.

Comparative Operating Costs
Per Car-mile

	Old Cars (1922)	New Cars (1925)	Saving
Equipment	5.44 cents	2.65 cents	2.79 cents
Power	7.51	5.46	2.05
Platform	6.21	5.27	.94
Total	19.16 cents	13.38 cents	5.78 cents

330-22

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ELECTRIC RAILWAY JOURNAL

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HOFFMANN Precision Roller Bearings combine the load-ability, the shock-ability, the speed-ability and the trouble-free simplicity which— in railway terms— mean maximum mileage with minimum maintenance.

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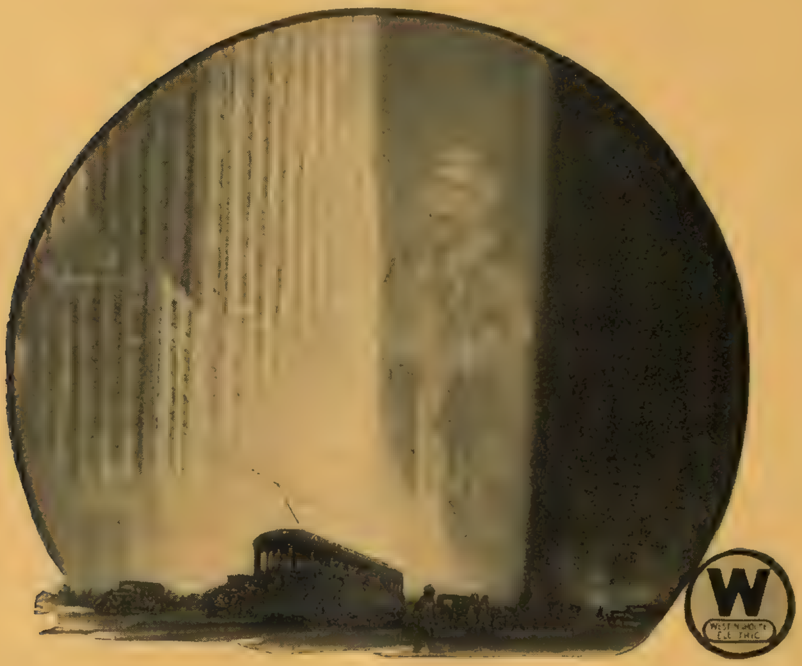

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Equipment

"How can we attract more riders to the trolleys?" was the question at Cleveland—and again came the answer, written in the experiences of scores of successful railways—

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The cars of another year cannot compete with the private automobile of today; new standards of comfort and service have been set up. Modern cities and modern people demand modern cars. Traffic figures prove that they patronize the modernized railway. Figures prove that people will ride comfortable, modern cars because they provide the cheapest safest, and fastest mass transportation.

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Again and again at the Convention—

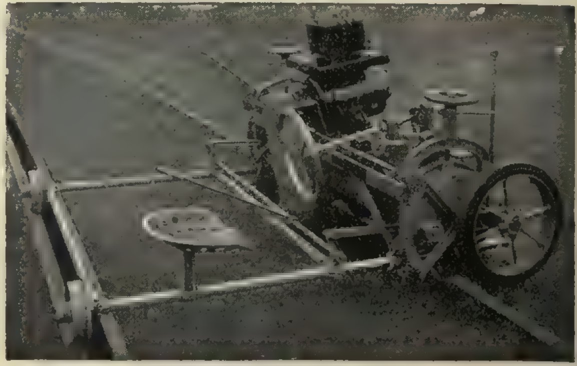
we had brought home to us the importance of trackwork in the modern program of ride-merchandising.

Smooth, well-maintained track can do as much as comfortable cars to make riding a pleasure.

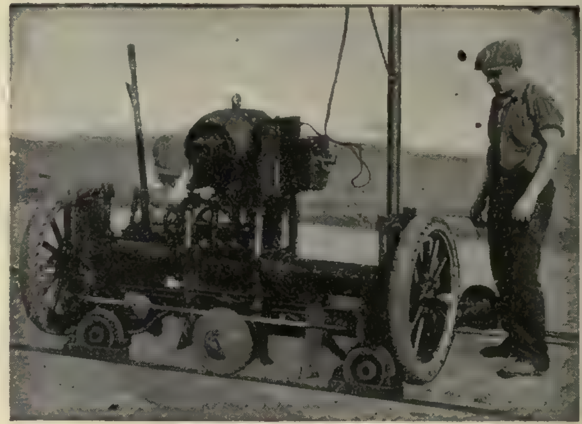
By reducing maintenance cost it becomes as important a factor of economical operation as the efficiency of modern mechanical equipment.

Moreover, it will go far toward eliminating noise,—an essential step in bidding for public goodwill.

And, judging by the number of prominently successful electric railway operators who were greeted by us at the Convention as old and satisfied customers, *we have the kind of track maintenance equipment that produces just such results.*

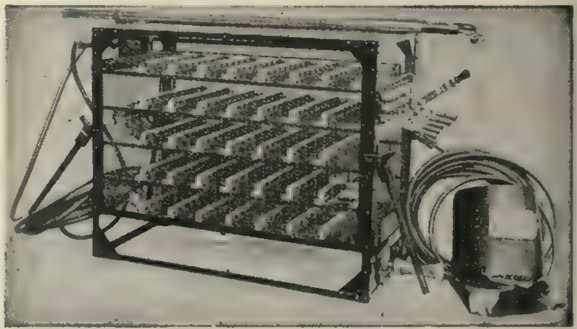


"Improved Atlas" Rail Grinder



"Imperial" Track Grinder

Reciprocating Track Grinder



"Ajax" Electric Arc Welder

Let us send you quotations and information on our complete line.

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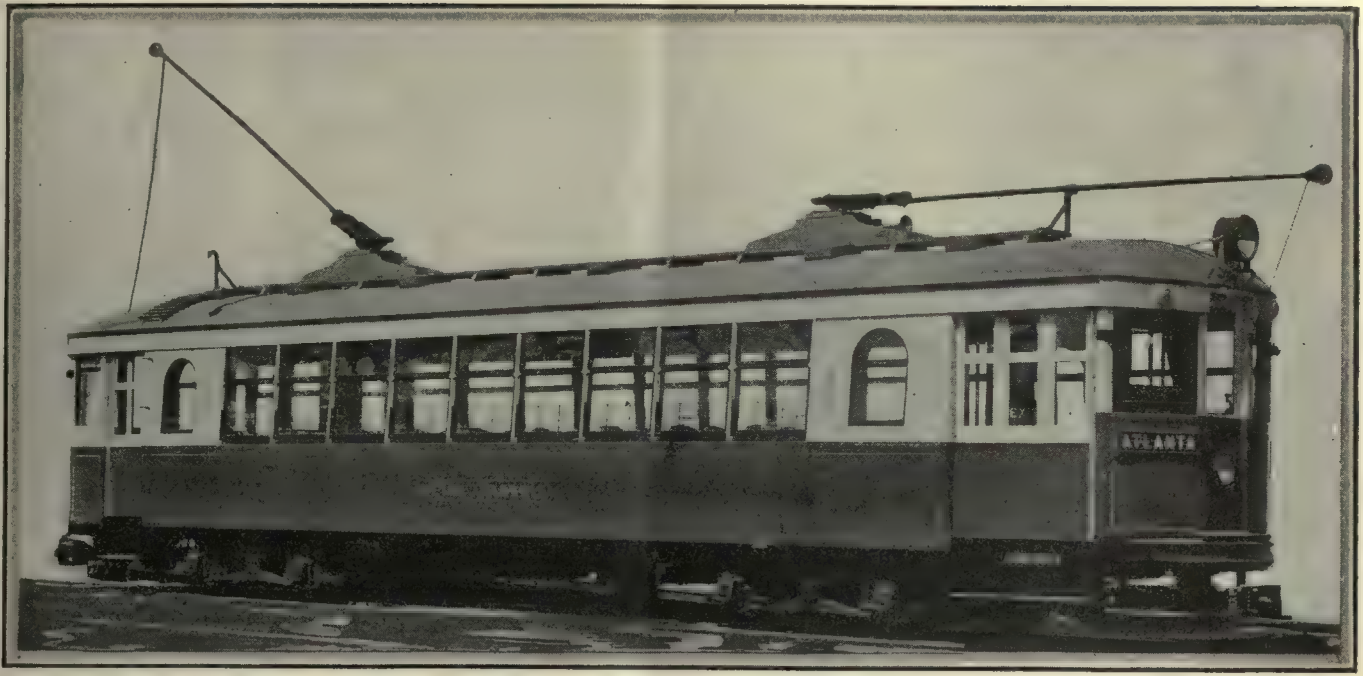
P. W. Wood Railway Supply Co., New Orleans, La.
Frazar & Co., Japan

1292

SAVING THE RAIL SAVES THE RAILWAY



The "Peter Caldwell"—a Symbol Of Modern Service

Tomlinson Automatic Couplers make all air and electrical connections. Air lines and electric circuits are interlocked by a disconnecting switch, insuring safe operation.

O-B Form 4 Trolley Base, with its long-life bearing and perfectly balanced spring assembly is ideal for both interurban and city service. Its special pedestal contact brush insures ample current capacity for operating a number of heavy cars in trains.

At left, roof-mounted Type SDH O-B Imperial Headlight. At right, O-B Imperial Type ZP Special Headlight.

The SDH Headlight, mounted on the roof of the car, is used for interurban service. The ZP Special Headlight, mounted in the car dash is for city service only.

WITH modern type cars coming into more general use there is marked improvement not alone in more economical operation, but in public relations. Street car patrons look upon the car itself as a symbol of the *quality* of service, and, as the Company's "customer attitude".

The Georgia Railway & Power Company knows how well car riders respond to modern equipment. Dedication of the "Peter Caldwell" car—the first of ten new interurban cars recently put in operation between Marietta, Stone Mountain, and Atlanta, Ga., was in every sense a civic event. Car riders showed that they appreciate modern equipment—that they take pride in the progressiveness of their street railway.

Of interest to street railway officials, particularly master mechanics, is the fact that O-B Tomlinson Couplers, O-B Form 4 Trolley Bases and O-B Imperial Headlights have a part in the operation of these modern interurban cars.

Ohio Brass Company, Mansfield, O.
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207C

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Can your cars "hold their own"?

City streets have become so crowded that there is constant competition between the various elements of traffic for the right of way.

If street cars are to meet this condition and hold their own in the general traffic movement they must be as mobile as other conveyances that use the streets.

An effective means of increasing car mobility is to provide brakes that will permit short stops, and the consequent longer period of peak speed operation and shorter running time between stops. With ordinary brakes, however, the retarding force which is satisfactory for the empty car is less effective when the car is loaded, so that the stopping distance lengthens, and this usually happens just when other vehicles are also contending for the right of way.

The Westinghouse Variable Load Brake was designed to correct this condition. It automatically adjusts the retarding force as the weight varies, so that the stopping distance is constant throughout the range of car loading. This results in accelerated transportation service just when the greatest possible hauling capacity is needed most.

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VARIABLE
LOAD BRAKES

Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—*Ask for Descriptive Catalogue T-2045.*

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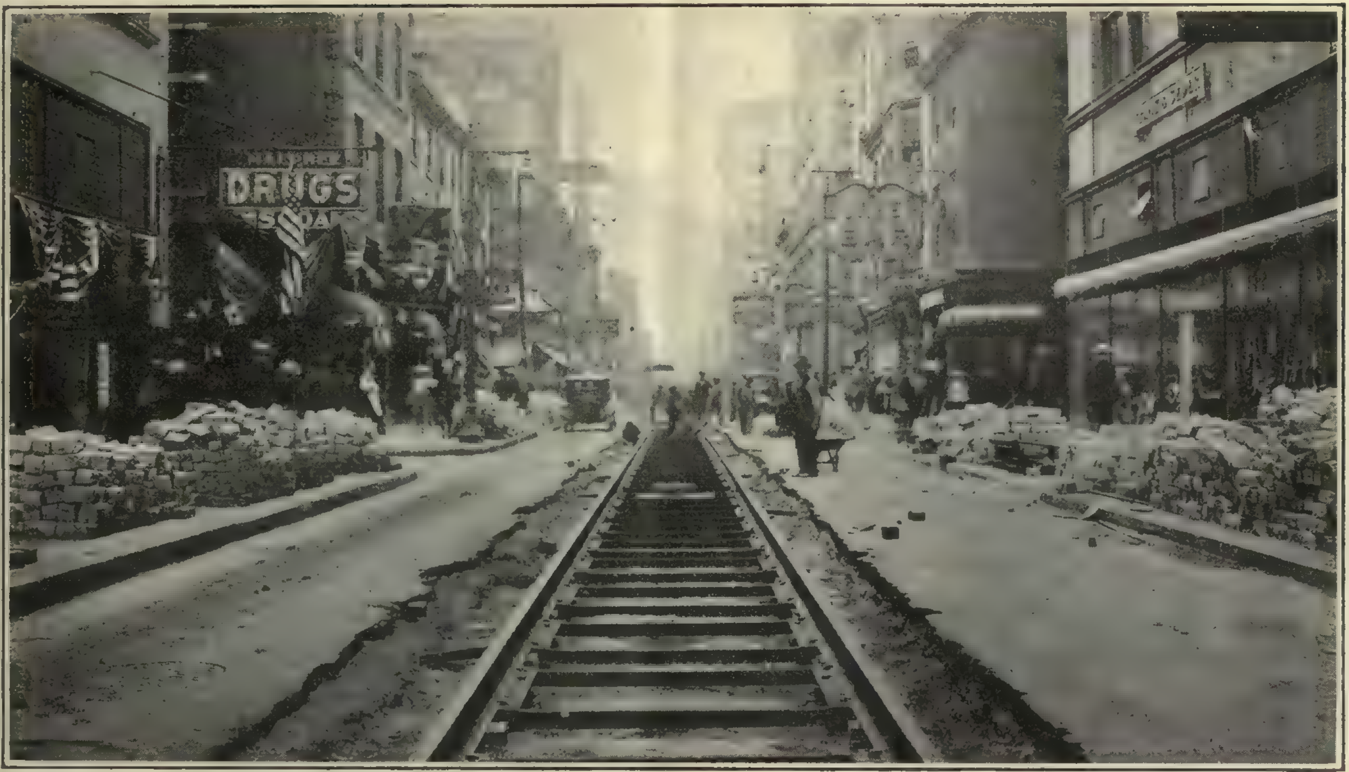

4 miles with Twin Ties
on the P. R. T.

One of the 30 odd installations of Twin Ties now in progress, or scheduled for the present season, illustrated above, is in Philadelphia.

Several separate jobs using either Standard Twin Ties laid on a renewable base, or Renewal Ties being used to build new track over old concrete base, are now in progress there.

We have prepared a folder describing all details of this work, part of which was done under traffic with quick-setting concrete, which we will be glad to send all interested railway men.

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

Steel Twin Tie Track
Renewable Track . . . Permanent Foundation

Safeguarding the fair and fare

Car riders and car revenue both need protection.

Efficient transportation service demands that traction companies make their cars safe and make them save.

You can make your modern cars SAFE by interlocking the control, brakes, and doors. You can make them SAVE by thus centralizing operating responsibility in one man whose duties are properly safeguarded and simplified by complete protective and labor-saving devices.

Safety Car Control Equipment assures that the fair can go safer and the fare go farther.

We make the Safety Car Control Equipment which makes the Safety Car.

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and now—

Franklin *Announces a New* Suspension Insulator

New suspension insulators of vastly improved design are now available. Casting aside the ordinary construction and assembly, Franklin is leading the industry by the development of new and better methods—methods which will at once convince you are but common-sense applied to insulator design.

Electrical failure of insulators is due to weakening thermally and mechanically, so that the porcelain no longer insulates. The higher the test strength of the insulator, the longer it will stand the strains of service before reaching the point of ultimate fatigue.

The cement surfaces of the new Franklin Suspension Insulator are covered all over with a coat of expansion compound, giving a resilient joint, and protecting it against thermal strains.

Mechanically, through corrective load application, the standard Franklin Suspension Insulator withstands tests for combined Mechanical and Electrical strength of 22,000 to 23,000 lbs. making it comparable to the ordinary so-called heavy-duty insulator.

Patent Applied for

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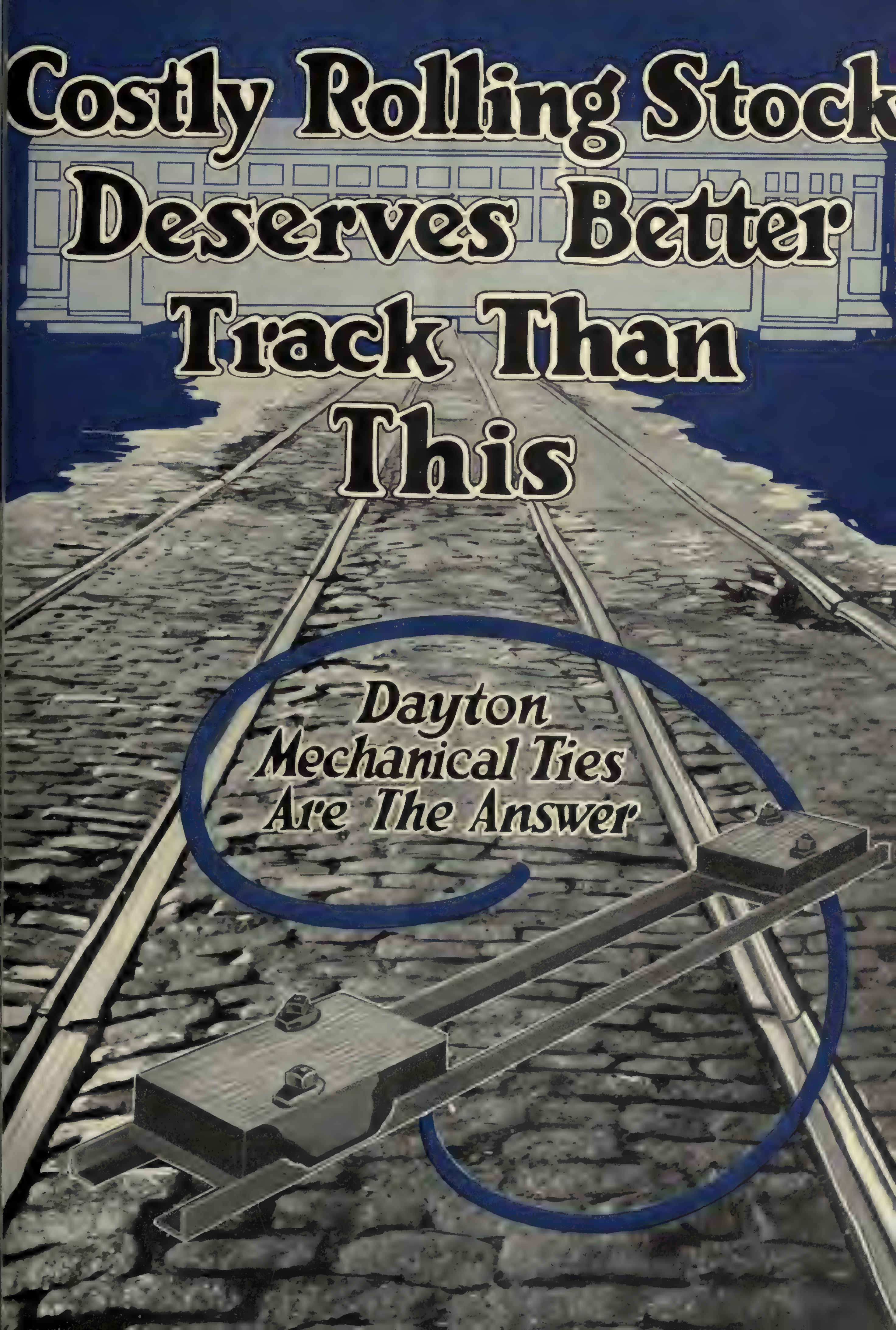

Costly Rolling Stock Deserves Better Track Than This

Dayton
Mechanical Ties
Are The Answer

Track Laid On Dayton Mechanical Ties Is Gentle With Rolling Stock

Track Laid On Dayton Ties 11 Years Ago—In Perfect Condition Today

Costly, splendid new rolling stock is doomed to rapid destruction if track over which it runs is not kept smooth. Vibration of traffic breaks down ordinary track, and bad track in turn destroys cars. Repairs shoot up alarmingly.

Dayton Mechanical Ties provide an in-built, permanent resilience which absorbs all vibration and shakes. Dayton Tie track stays in perfect condition with very little maintenance for years—installations made 11 and 12 years ago look good for many years more.

Perfect smoothness, plus resilience makes such track remarkably easy on rolling stock, and unusually quiet.

Let us tell you how Dayton Ties have saved rolling stock for others.

The Dayton Mechanical Tie Co.

DAYTON, OHIO

Milwaukee has 764 Economy Meters

INSPECTION DIALS
The Economy Meter with Car Inspection Dials is readily adaptable to any electric car or locomotive equipment.

1917
350

1919
175

1922
182

1923
17

1926
40

EXPERIENCE has shown The Milwaukee Electric Railway & Light Company the value of Economy Meters. Starting with 350 Meters in 1917 they have continued to order more and now have 764 in use.

The Economy Meter through its proved ability to induce savings in power consumption and in car house labor has become the standard on more than 200 roads. The savings accomplished are from $\frac{1}{3}$ to $\frac{1}{2}$ cent per car mile.

You can buy a complete equipment of Economy Meters at a monthly rental of less than one half the value of the power you will be certain to save. Let us show you an estimate of savings, operating, and rental costs for your conditions.

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1. **"Curved Side Construction" wide seats and aisle with ample vehicular clearance.**

2. **Windows set in Cast Aluminum Side Frames—light weight, and non-rattling.**

3. **Superstructure tied to bolsters with high carbon steel bows** continuous from side sill to side sill.

4. **Scientifically Correct Lighting and Ventilation.**

5. **Duplex Air and Magnetic Brakes** decelerating from 60 mph to stop in less than 800 feet in a period of 14 seconds.

6. **Special intermediate full length door hinges prevent sag.**

7. **Furniture Finish Armco Rust Resisting Side Panels.**

8. **Case-Hardened Alloy Steel wearing parts on trucks.**

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is as specific in application as it is positive in results—

Out of the most successful of all conventions comes a NEW conception of the modern car,—a passenger-attractive transportation vehicle that will STAND OUT among all its competitors.

Everyone who visited the Cincinnati New Car Exhibit at Cleveland noticed the difference at once. They realized that here at last were cars so thoroughly up-to-date in design and appearance as to make an immediately favorable impression.

Balanced design is no mere engineering term. Its application as the dominant principle of Cincinnati Lightweight New Car construction has resulted in many improvements as specific as they are original.

By boldly breaking with precedent in bringing both design and actual building of Cincinnati Cars under one experienced supervision, it has been possible, accurately to balance each separate detail of construction in its relation to the whole. The completed unit thus expresses in every line and feature, the one purpose for which it was built,—be that purpose high speed interurban, moderate speed interurban, freight, or modern city service.

But Balanced Design goes further than this. Radical measures were necessary to lift the electric railway car to its rightful place among 20th century transportation agencies. And some of the improvements listed on these pages, which are an important feature of Cincinnati Balanced Design, might be considered radical in the light of older practice.

One thing is certain, however,—each and every one of these improvements has behind it sufficient operating data to prove conclusively its claim as a practical contribution to low-cost, passenger-preferred electric railway service. The formula is fixed and results can be duplicated!

Such data and the experiences of many successful Cincinnati Lightweight New Car operators are kept in our files,—available to any interested electric railway executive on request.

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CINCINNATI, OHIO

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New
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A step ahead of the modern trend

American BROWN BOVER

4. Ver

Mercury-arc power rectifiers are completely proof against damage from short circuits on the line, as there is nothing which can burn out in the interval before the circuit breakers trip. Sharp peaks, of momentary duration, such as are customarily incurred in traction operation, are readily handled by the Mercury-Arc Power Rectifier, even up to several hundred percent over normal rating.

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no glass parts

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- *Mercury-Arc Power Rectifiers (steel enclosed)*
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- *Motor Generators*
- *Diesel-Electric Locomotives*
- *Mining Locomotives*
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- *Steam Turbo Generators for normal or high pressures and superheats*
- *Oil Switches*
- *Condensers and Auxiliaries*
- *Relays*
- *Turbo Compressors and Blowers*
- *Electric Furnaces*
- *Induction Regulators*
- *Ships*
  - *Diesel Driven*
  - *Turbine Driven*
  - *Electrical Driven*
- *Structural Steel Fabrication*

ercury-Arc Power Rectifiers

igh momentary overload capacity!

Chief Advantages

(1) Efficiency high over the whole working range.

(2) Simple operation and minimum attention.

(3) No synchronizing.

(4) Very high momentary overload capacity and insensibility to shor circuits.

(5) Negligible maintenance.

(6) Low weight. No special foundations.

(7) Noiseless and vibrationless operation, consequently rectifier substations can be erected in densely populated localities.

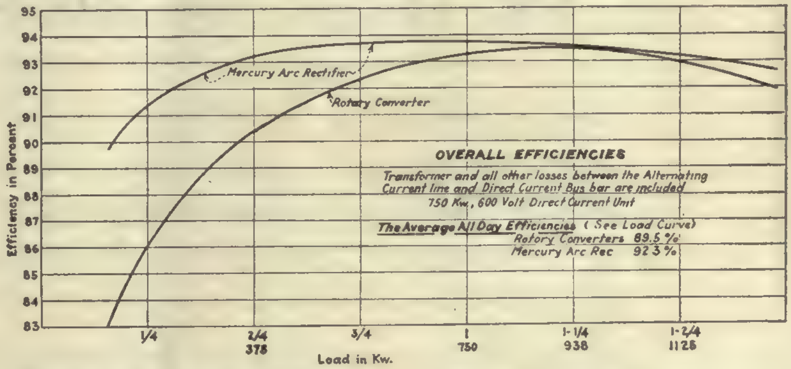
(8) New sub-stations need only be of light construction. In many cases old houses can be converted, while the plant can often be erected in places that could not be considered for rotating machinery.

With a BROWN BOVERI MERCURY ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, *cut down tremendously,* even at Rail Voltages as low as 600 V.

Below is shown what can be done in an Actual Case by the use of Mercury Arc Rectifiers. The reference is to an Interurban Railroad in one of the Eastern States. The substation rating is 750 Kw.-H., 600 V. The part of a record roll reproduced on this page shows the usual output over a period of six hours.

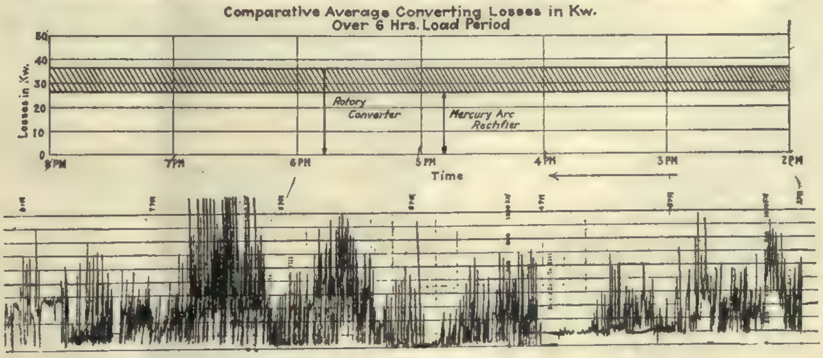
The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

for Rotary Converters.............. 89.5%
for Mercury Arc Rectifiers.......... 92.3%



The saving obtained in six hours (represented by the shaded area) when extended over a 20-hr. day, amounts to MORE THAN 200 KW.-H., or, at 1c. per Kw.-H., THE ANNUAL SAVING effected is $730.00, which is the INTEREST on MORE THAN $10,000.00.

In addition to the power saving, the maintenance cost will be less than half as much as with rotary converters.



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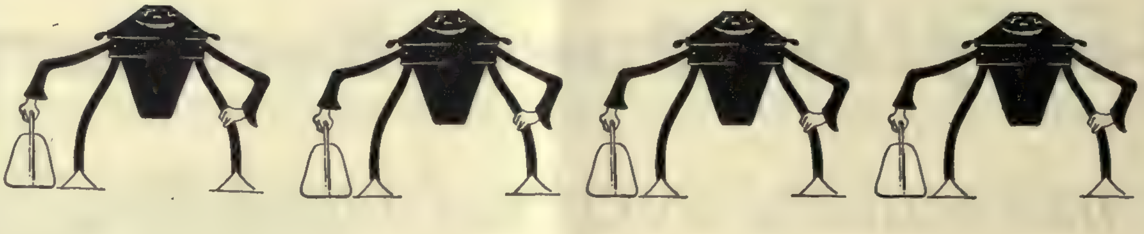

The Convention is over but we're not going home!

No doubt about it, the industry is out for *action*. We ourselves had an *action* exhibit. We showed how simply and quickly Thermit Welding can be done. We demonstrated the advantages of a smooth continuous jointless track and we proved beyond doubt its greater economy in maintenance.

So they who came, listened and went away convinced.

And we're going out right now to help many a forward looking property to a worthy road bed for its new cars.

If by any chance you were not at Cleveland, and could not see the instructive Thermit Welding Exhibit, when the actual work was demonstrated in all its phases, have one of the Thermit engineers come and see you. Everything claimed for the Thermit Weld can be proved to your satisfaction. Installations all over the World give ample actual operating data. We'll gladly "show" you.

THERMIT

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METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

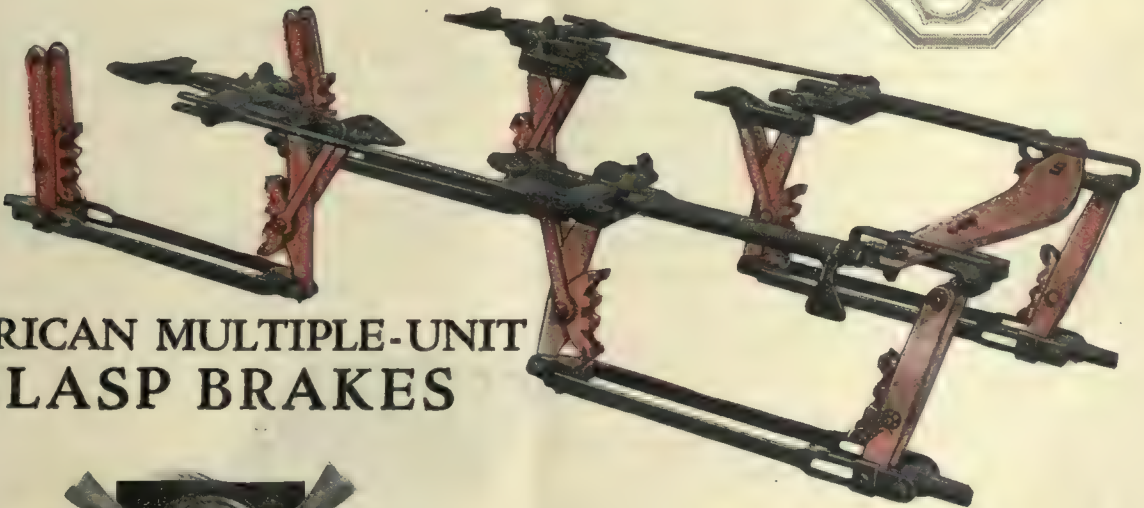
AS LOGICAL AS THE BALANCING OF SCALES

To obtain the unknown weight of an object, by balancing it with known weights was one of the earliest scientific developments. This principle of equalization of forces has had countless practical applications. It is logical.

In the modern railway clasp brake, equal pressure is applied to opposite sides of each wheel, through standard brake shoes, whereas the ordinary practice is to apply the force to one side only. The clasp brake, or balanced braking system, neutralizes the tendency to one-sided wear on journal bearings, pedestals and other truck parts. It affords smoother braking with less heating of brake shoes, and reduces the number of "slid-flat" wheels.

In short—it is the modern and scientific braking system—which is finding increasing favor for heavy traction, and rapid transit service.

ASF



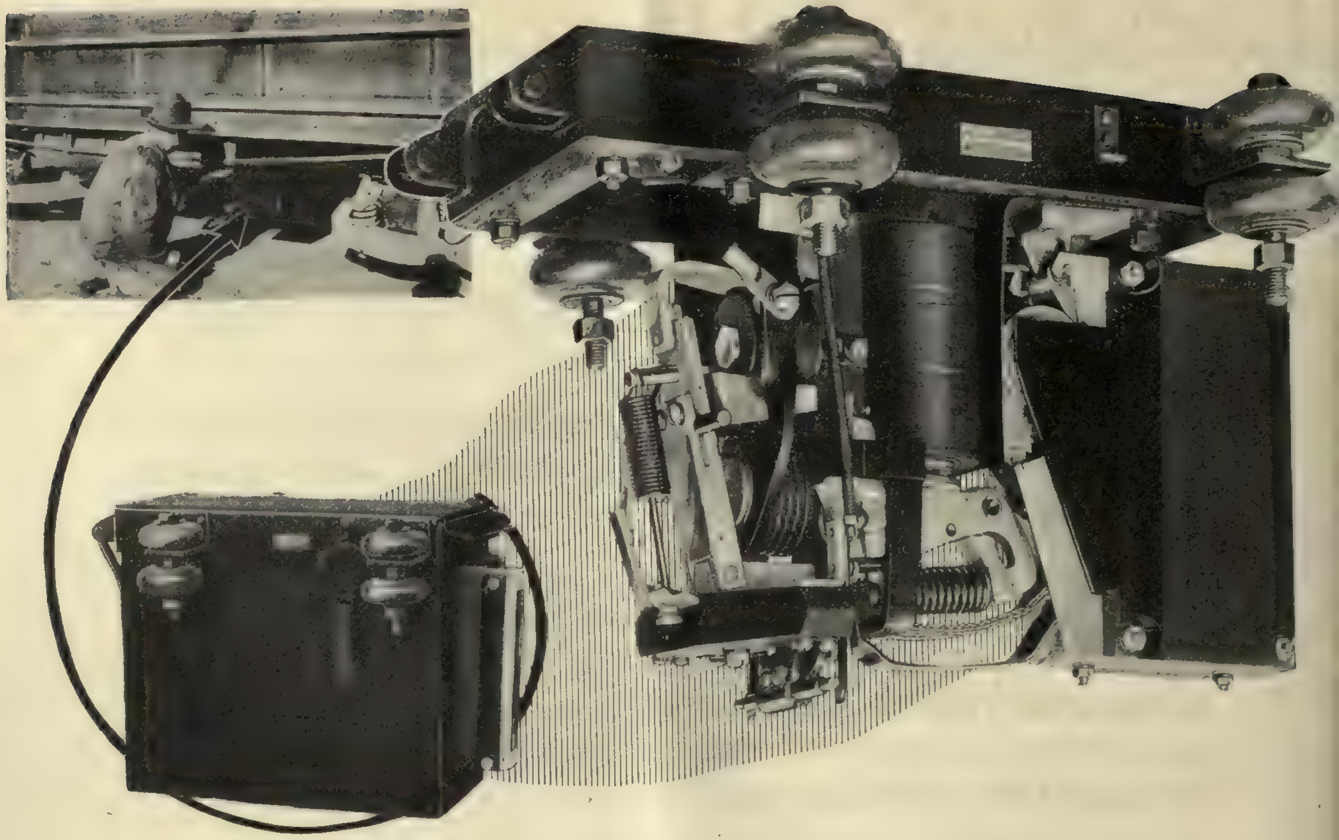
AMERICAN MULTIPLE-UNIT

CLASP BRAKES

Balanced Braking

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



As every user will tell you

Under the car, out of the way, the Line Breaker helps solve the perpetual problem of maintaining equipment economically.

It reduces controller contact wear and prevents improper starting and running practices, all of which contribute to high maintenance expense and shortened life of car equipment. It reduces maintenance by eliminating the causes.

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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A New Day in Local Transportation Dawned in Cleveland

THE 45th annual convention of the American Electric Railway Association has just come to a close in Cleveland. What a convention it has been! In years to come it will stand out as a landmark on the route of progress; as the turning point in an industry's awakening. To say that this convention has exceeded the expectations of the most optimistic is putting the situation mildly. As sometimes happens when the minds of individuals turn toward a common objective, the spirit of the group becomes contagious and sweeps along the doubting Thomases as it rises in a mighty tide of confidence and enthusiasm.

At Cleveland there was more than abstract opinion. There was more than mere enthusiasm. There was concrete evidence not only of confidence and progress, but of the fact that this is only the beginning of a new era in local transportation. All records for an electric railway exhibit were exceeded. The industry rubbed its eyes in amazement to find itself staging an exhibit which, so far as can be determined at this time, exceeds any other similar independent exposition ever held in this country for a single industry. Surely such an event is significant for the industry which Mr. Loree and other false prophets were ready to relegate to the scrap pile!

A total of 271 exhibitors occupied 119,007 sq.ft. of inclosed space and 1,790 lineal feet of track space. There was a total of 41 different car exhibits by 19 companies. Ten companies showed operating maintenance of way equipment. Bus, truck and body manufacturers, totaling 31 companies, occupied 43,283 sq.ft. of space. Including the area of car and operating track maintenance exhibits, the entire space occupied approximated 200,000 sq.ft.—a staggering total. It is particularly significant that the car exhibit was the largest ever held in the history of the industry.

Nor did the size of the exhibit exceed in its significance the proceedings of the convention. A renewed confidence and determination to drive ahead along constructive lines was voiced by leader after leader in the transportation world. Back of the words themselves was evident a spirit and an enthusiasm which was felt by every delegate from low to high position. The impression of the opening of a new era in transportation was strengthened by the addresses of men representing the public's viewpoint. There was general recognition of the need for organized transportation, of the difficulties attending the effort to give convenient and efficient service, and of the extent to which individual right to the use of streets and highways must be curtailed when that becomes necessary in the community interest on the principle of the greatest good to the greatest number.

Thus in all of its phases the Cleveland convention was full of significance. The local transportation industry has definitely taken the offensive in building its business. It has a determination to win back its prestige in the eyes of the public and the bankers of the country. It is no longer passively awaiting help from an uninterested public. It is moving forward rapidly in a program of self-improvement which offers the only known means of winning public support and good will.

Engineering Is Made the Servant of Transportation

DISTORTED ideas as to the place of engineering in electric railway operation were conspicuous by their absence at the Cleveland convention. In the past the engineer too often has forgotten the part he should play and has exaggerated the importance of some technical detail until in his eyes it loomed larger than the successful operation of the cars. On the other hand, a tendency has been in evidence sometimes to regard the engineer as a kind of superfluous appendage to the organization, one whose views are interesting, but of no great practical value.

At Cleveland, however, the proceedings of the Engineering Association portrayed the members as technical specialists whose job it is to make better transportation service possible. How to increase the comfort of the passenger, improve the appearance of cars, speed up operation, reduce costs, eliminate noise, and insure reliability of power supply are examples of problems the engineers are tackling today.

Only a few speakers were so obsessed by their own hobbies that they could not see the larger picture. Suggestions that certain power and track troubles could be avoided by running the cars at slower speeds fell on deaf ears. To solve the technical problems that confront the industry, not to evade them, was the attitude of the great majority of the engineers. To make engineering the servant of transportation was shown to be the firm determination of this association. With this high purpose the achievements of the coming year promise to surpass the commendable accomplishments of the twelve months just ended.

Convention Exhibits Formed a Vast Educational Display

IN SIZE, cost and educational value, the exhibits at the Cleveland convention of the American Electric Railway Association surpassed any transportation exhibit ever held. The influence that they will exert on electric railway men who were fortunate enough to view the magnificent display should produce a decided result toward providing faster, safer and more attractive transportation.

The vehicles, rolling stock, equipment and materials shown were for construction and operation, however, rather than maintenance. Shop equipment such as machine tools, material handling apparatus and labor-saving devices for repair shop usage were few. This deficiency, however, was made up for, somewhat, by the close proximity of the Harvard shops of the Cleveland Railway and large numbers of mechanical-department delegates took advantage of the opportunity to inspect these well-equipped and efficient railway shops.

All classes of electric railway delegates obtained much of interest and value from the very complete car and bus display. The car exhibit was not only the largest ever assembled but it was complete in that cars for all classes of service and work were shown. A large number of operating companies took exhibit space and sent their most attractive cars to Cleveland at their own expense in order that the industry as a whole could profit by the attractive designs. Many other railways loaned cars to various manufacturers for display at the convention.

The importance of buses in rounding out a complete transportation system was admirably illustrated by the 79 bus and chassis units shown. Parlor cars or similar designs with wide window drapes predominated. The city type has grown so luxurious that it is hard to make a clear separation from the de luxe type. The big thing of the bus displays and the biggest of all exhibits was the continuing note of the enlarged passenger automobile and the realization that the rider must be weaned away from his unit of individual transportation.

For the first time in the history of the association a display of line material over tracks was shown. Also street lighting fixtures had a prominent place in the Cleveland exhibits.

The importance of accessories to electric railway transportation was shown by the vast displays devoted to these lines. Every detail needed for construction and repair of buses and cars was displayed and also devices needed for conducting transportation in the most efficient and attractive manner. Among these were included paints, varnishes, lubricants, fare boxes, registers, turnstiles, cables, wheels, shoes, bearings, lighting equipment, as well as signals, ties, rails, frogs and switches. Bus accessories included tires, leathers, seat covering, speedometers, transmissions, brakes and many detail bus parts.

Advisory Council's Principles Point the Way to Success

A CAREFULLY prepared, conservative statement of principles is contained in the address of B. C. Cobb at the meeting held Tuesday night under the auspices of the Advisory Council. While he expressed deep faith in the industry and paid tribute to its courage in the past, he did not stop there.

Mr. Cobb gave a warning that his remarks might be considered pessimistic. But in reality they are not so, for electric railways are needed and will continue to serve the public. He feels that it is idle for the railways to sit back expecting the public to take the initiative. He insists that the facts in the situation must be faced and that there are serious problems to be solved. He advocates frank publicity and courageous recognition of these facts. He holds that electric railway employees as well as their managements must have the interests of the industry at heart to assure success.

Mr. Cobb did not leave his audience in the dark, groping for a way out. He told them what is needed—modern methods and equipment, improved service, salesmanship, employee interest, frank publicity. He made concrete these general statements in a code of principles —a list of things the companies, the employees and the public must do, which he laid down as the fundamentals of success for the electric railway industry.

Mr. Cobb spoke not from theory but from practice. The Advisory Council has followed closely the experiences of properties which have been applying these principles. Mr. Cobb himself has the general responsibility for many properties on which they are being worked out in practice.

Courage, determination and energy are needed for success. When these are guided and tempered by the sound business judgment laid down in the Advisory Council's principles, success may be reasonably expected.

Real Progress Made in Solving Corrugation Problem

OPTIMISM concerning the eventual solution of the old problem of rail corrugation was evident in the sessions of the engineering association. The final answer has not yet been found, but definite progress undoubtedly has been made.

Corrugation is a problem which has been remarkable for its periodical recurrence during the history of the industry. As soon as some one finds what he believes to be the exact cause of this mysterious malady some one else comes along and upsets these conclusions by finding that neither the cause nor the cure is applicable to the disease as it occurs on his property. Rolled steel and cast wheels, rigid and flexible roadbed, tight track and loose gage, vibration, wheel slippage, cold rolling of the rail metal and chattering brake rigging are a few of the many elements around which theories of cause and mitigation have been built up.

Summing up the causes and remedies suggested by the committee and various speakers contributing to the discussion, it appears probable that all of the apparently conflicting explanations are correct and that they represent simply different phases of a problem containing many variables. If this be a true conclusion, then many of the paradoxes and anomalies of the problem can be understood. Under certain conditions it may easily happen that one factor, such as tight gage, would be so influential that it becomes the proverbial straw that breaks the camel's back. Thus it might appear to be the direct cause of corrugation, whereas in reality it is only one of a number of contributing causes. In other cases a different factor might be predominant and seem to be the active cause, the mitigation of which would bring relief. This theory of many variables is the more credible because in other fields of scientific endeavor similar elusive problems, when solved, have been found to be influenced by a number of factors.

The special committee on rail corrugation is attempting to gather and analyze all the data that it can secure before trying to formulate conclusions as to causes and remedies. Obviously this is the proper procedure. Loose generalizations based on inadequate data and personal opinion are often dangerous. Worth-while advances in medicine, physical sciences and engineering usually have been based on analyses containing adequate data and experimental evidence and drawn with an open-minded attitude. Good reasons exist to hope that the same method will in time solve the perplexing problem of rail corrugation.

Street Car Progress Reflected in Cleveland Exhibit

PLEASING appearance, comfort and general attractiveness stood out in the car exhibit at the convention as the present day objectives in car design. Combined with this there was evident in most of the exhibits a continued development toward one-man operation and light-weight construction. From the general lines and appearance of the various cars displayed to the details of truck and body construction there was much to hold the interest of railway operators in this, the largest street car exhibit in the history of the industry.

Operators, as well as manufacturers, joined in making such a showing possible. Many of the cars were taken out of actual service on properties where they have already demonstrated their value in building traffic and reducing costs. New ideas were legion, and interest in the exhibit ran high. Thousands of electric railway executives manifested by their questions and their attention to these cars the thought being given throughout the industry to the subject of car improvement.

New construction features and the use of new materials were evident as never before in a car exhibit. But marked as were some of the improvements shown, and wide as was the variety of new ideas represented, these may be considered only the beginning. Discussion between operators and builders was rife with possibilities. The exhibit itself was in this respect only symbolic of the plans which are already under way on various properties in the country to bring about even more radical changes in design.

Much interest centers in the construction of trucks. There are under way at the present time several efforts to reduce the amount of unsprung weight incident to carrying the motors directly on the axles. Various forms of bevel or worm gear are being proposed, which would not only accomplish this but would also provide oil-tight housings to improve lubrication and reduce noise.

All in all, the Cleveland exhibit, although it was the greatest ever held by the industry, appears to be just the beginning. The next year will be one of intensive research and accelerated development. Electric railways are genuinely interested not only in new cars but in further developments to increase their attractiveness and improve their performance.

Carry the Convention Home with You

WHEN President George Clifford said "Take the ideas home and put them to work," he gave the one message that can justify the extensive sessions of the Transportation & Traffic Association work. Four valuable reports were presented this year and much pointed discussion followed. All this will be of no avail if operations that may be lacking in some essential details go unchanged as a result of these reports. The subject of traffic congestion and accidents is ever upon the industry. Bus operation is still in its infancy. Papers and reports at the convention represent the most modern thinking on these subjects.

The suggestion of Mr. Clifford is equally applicable to the work of all the associations. Committees have been working, some for a year, but many for much longer periods, and developing important information as a result of research and experiment. There is material of value in all of the reports, instantly available. The convention is not over. It should never be over until the material and ideas presented have been exhausted by every operator. No better message can be drawn from the association work this year than to "take the ideas home and put them to work."

Tragedy at the 45th Convention Must Not Mar the Inspiration of a Great Life

ACCOMPANIED by one of life's dramatic tragedies, the setting for which has never before been equaled, the 45th convention will long be remembered. After an active life of 63 years devoted so intently to the promotion of the electric railway industry, John J. Stanley culminated his career by bringing this remarkable convention to Cleveland. At the close of the first day, and at the conclusion of his "president's dinner" to some 60 leaders of the industry and life-long friends, Mr. Stanley passed to the Great Beyond. His death occurred at the very hour, even at the very minute, that marked the pinnacle of his remarkable career. To those who knew him best, it was a fitting setting despite the sadness. He died in harness and among the friends he loved best.

Often the burden of such events bears heavily on those left behind. Realize the effect on Mr. Stanley's lieutenants who did so much to bring this exhibition to a successful conclusion. The work to carry on for the remainder of the brief week was enough to try the hearts of strong men.

Now is the time to think of the greatness of accomplishment and to forget the play of fate that so dramatically linked the passing of this great leader with the recent migration to Cleveland. After all, death is only a natural step in the process of life that can be enhanced by a firm resolve to carry on to loftier heights the ideals created by John Stanley.

Changes in Program Caused by Mr. Stanley's Death

THE death of Mr. Stanley on Monday evening just at the opening of the convention necessarily affected all plans during the rest of the week, the most important change being the abandonment of the entertainment features. Of course, in cases of this kind, two views are always possible. One would be that the success of the convention and a pleasant time for every one were undoubtedly the two greatest desires of Mr. Stanley for some time prior to his death, and that respect for his memory would best be shown by very few changes in the program.

The other view would be that the convention was being held in Mr. Stanley's home city, so that, in a sense, he was host of the association, and that as he was held in such great respect both by members of the association and by the people of Cleveland, the action taken was appropriate. The latter view was the one taken by the most intimate personal friends of Mr. Stanley who were consulted, as well as by the city authorities, so it is the one which prevailed. The sessions and the exhibits went on as usual except for a few changes in time for the meetings and opening of the exhibit to the public Thursday night, as well as on Wednesday night, in accordance with an expressed wish by Mr. Stanley on the day of his death, that the Cleveland people might see more of the exhibits.

Entire Industry Shocked by Death of John Stanley

Veteran Leader Passes Away from Heart Failure on First Day of Convention—Delegates Unite in Testifying to Ability and Sterling Character of Cleveland Railway's President

JOHN J. STANLEY

"IN the midst of life we are in death." Seldom have the words of the psalmist been more forcibly brought home than they were in the sudden death last Monday night of John J. Stanley, president of the Cleveland Railway, during the progress of the convention of the American Electric Railway Association in that city. In that call not only his immediate associates mourned, but a whole city suffered a loss well-nigh irreparable.

The gracious host who made possible the Cleveland convention died from heart failure at the Union Club about 9:30 p.m., shortly after the close of a dinner he had given to visiting electric railway executives.

During the dinner, Mr. Stanley was apparently at his best. With some 60 leaders of the industry and life-long friends as his guests at the club, he acted as toastmaster. At 8:55 p.m. he announced that the dinner would adjourn to the auditorium for the president's reception. The guests tarried and were gradually leaving. All but a dozen or so had left and Mr. Stanley was chatting with some of his friends in the lobby of the club when he suddenly called to Paul Wilson, secretary of the Cleveland Railway, who was with him, "Come quickly, Paul, I want a doctor." This was a little after 9 p.m. Dr. Henry Prill, assistant surgeon of the Cleveland Railway, was soon located in the Statler Hotel across the street. But when he arrived five minutes later the genial host of the convention was beyond medical aid.

His best friends said of Mr. Stanley that he died as he had always wished—"in the harness." This 45th convention, for which he worked so hard, was a climax to his career as a pioneer in the industry which he loved so well and to which he had devoted practically his entire business life.

John J. Stanley typified the hard-working, aggressive man who has devoted a whole working lifetime to the upbuilding of an industry. Born on March 5, 1862, he soon made up his mind that the destinies of the transportation business were to be his own. His father had been president of the old Broadway & Newburgh Railway, forerunner of the present Cleveland Railway system. Perhaps that explained John Stanley's choice of a career. At any rate, his own pathway was not strewn with roses.

He entered the railway business at the age of 14 years. His duties were those of "hill boy," in the horse-car days. Although the son of the president of the company, his early days were difficult ones. No great esteem for the railway filled the minds of patrons. But through it all John Stanley came triumphant. He was first promoted to be an inspector and at the age of 29 years was the youngest general manager in the country. This was in 1891.

When the Tayler grant was put into effect sixteen years ago John Stanley was elected president of the Cleveland Railway. Previously he had been vice-president and general manager. The creditable record was his of having been president of a metropolitan railway company longer than any other man in the country.

Mr. Stanley's activities throughout his career have been directed, not only to the furthering of the street railway fortunes, but to the end of general civic growth and betterment. His love of the city in which his life has been lived was great. Opportunities in other sections of the country were frequently offered to him. But he had set out to do a big job there and with single-minded intent, he stuck to his task through adversity and ultimately achieved success. His place was a great one—his memory, and the breadth of his interest in the city of Cleveland and its transportation future will live with Cleveland and with the electric railway industry.

It is very easy to grow laudatory; but words, no matter how forcefully or gracefully used, do not convey the message that is carried in acts. And it was the acts of John J. Stanley that made the man what he was. When a whole city goes into mourning for a man, when flags are at half mast for him, when police and firemen

Resolution by the American Electric Railway Association

The committee appointed by the Executive Committee to prepare a memorial on the death of Mr. Stanley submitted the following:

ALMOST at the start of this great convention of the electric railway industry, the man whose enthusiasm, whose executive ability and whose generosity was in large measure responsible for its being, has been stricken by the hand of Death.

John J. Stanley is no more, and the industry, this association as an organization and its members as individuals have suffered an irreparable loss.

A pioneer in the electric operation of street railways, through his long career as an executive, John J. Stanley kept abreast with progress; a man of human understanding and human sympathies; he maintained with the public he so well served friendly relations worthy of our emulation; a man of keen business knowledge and acumen, he successfully conducted the affairs of the public service corporation of which he was the head; a man of fairness and justice, John J. Stanley had the respect and love of those who served under him. These attributes made him a leader in the industry which this association represents, and gave to his advice and counsel a peculiar value. His service to the association while its president and as a member of its executive and other committees cannot be overestimated. But it is as a loyal and faithful friend, genial, kindly and self-sacrificing, that all who knew John J. Stanley will best remember him, and these memories of his friendship will forever remain in our hearts.

Our sympathy is extended to the family and personal associates of our dead leader. We realize to the full the extent of their loss and we share with them their sorrow.

Let this memorial be spread upon the association minutes and a copy be sent to the family of John J. Stanley.

pay a citizen in private life the respect the residents of Cleveland did Mr. Stanley, there is something tremendous that moves the public. The Cleveland system shows it as the outward symbol. The public reflected it by their acts of respect to the man who had died.

It is not unusual in these United States for men to rise to power and riches from humble beginnings, but too often men forget their beginnings. This Mr. Stanley never did. As the psalmist said: "He heapeth up riches; and can not tell who shall gather them." Of the riches Mr. Stanley heaped up for his beloved city all Cleveland will share. He was a refuge for Clevelanders for generations. There was a natural body and a spiritual body to John Stanley, and despite all the turmoil of the past in Cleveland at all times the spiritual took precedence in this man. Long after the present generation that knew Mr. Stanley as railway president and as a civic force shall have passed, the recollection of him as a civic force will endure. His work assures that.

Tribute from Railway Executives

At the opening of the session of the American Electric Railway Association on Tuesday morning, resolutions of the executive committee on the death of Mr. Stanley were read and approved. In addition four executives paid individual tribute to Mr. Stanley's memory.

From remarks of

THOMAS N. MCCARTER

"Mr. Stanley was to my way of thinking the most successful type of operator that the industry has known, and the result is the wonderful Cleveland Railway system which has passed so many vicissitudes; which is, perhaps, the premier electric railway of the country. Mr. Stanley believed in what was right and he went after it.

"Personally, I feel I have lost an intimate friend. His work will go on. He has a splendid organization here in Cleveland. No man could run a great company without this. The industry will sorely miss him."

From remarks of

GEN. GUY E. TRIPP

"A man, to be a successful street railway manager, must be honest minded, he must be sincere and truthful, he must hold steadfastly to principles and that is what John Stanley was and did.

"Cleveland has lost a great asset because there aren't many citizens in any city like John Stanley; men who are public spirited, men who try to do things for the public good with the least possible selfishness involved in it. Therefore, Cleveland has lost a valuable citizen. It has also lost a very valuable servant, a valuable public servant, because it is obvious that there is no better operating transportation system anywhere than you see here in Cleveland."

From remarks of

LUCIUS S. STORRS

"Doubtless there is no man in the electric railway industry of America whose advice and counsel were sought more by those who were confronted in their individual relations, with their own particular problems, or in the possible change in relation from one property to another, than John Stanley. The trail to John's door has been beaten by the feet of many of the men here today. We feel a great loss and those of us in the association feel the loss of advice and counsel which he always gave with so deep an appreciation of human problems."

From remarks of

ARTHUR W. BRADY

"No member of this association could have passed away whose death would have created a greater sense of personal bereavement among so many members of the association as that of the man who passed beyond last night.

"One feature that I think all of us felt, whether we knew John J. Stanley well or whether we knew him only slightly, is that in him the electric railway industry had at the head of one of its most important agencies an individual who was a real man, quiet, unassuming, loyal and a true friend to every man whom he knew, and fair and just to the public that he served, as well as to those who joined with him in giving the service which has created the magnificent railway that exists in the City of Cleveland."

Willits Herbert Sawyer

Newly-Elected President of the A.E.R.A.

EVER since his entry into the electric railway field W. H. Sawyer has been active in the affairs of the American Electric Railway Association and its predecessors. This last year he has been vice-president of the association, chairman of the policy committee and a member of the Coffin award committee and the public speaking committee. In 1925 he was second vice-president of the association, member of the policy committee, chairman of the subjects and meetings committee, member of the committee on constitution and by-laws. The record of his committee and other activities in the interests of the industry is a similar one back through the years. That record indicates the verisimilitude of the man in that it has included work by him on committees dealing with such diversified subjects as fare systems, state and national associations, electrolysis and valuation.

An Engineer and Operator of Wide Experience

His professional career as an engineer and his business career as a manager have also been diversified. He started out after his graduation from the University of Nebraska in 1894 with the degree of B.S. by spending two years with several street railways, but he knew that one of the greatest post-graduate courses in the country was to be had at the plant of the General Electric Company. There he went for more experience, and there he remained for nine years. Next he entered the employ of Ford, Bacon & Davis. There he remained another nine years. So when in 1914 he went with the E. W. Clark & Company Management Corporation as vice-president with headquarters in Columbus, Ohio, he had behind him a record of engineering experience that even the wide holdings of that organization failed to exhaust. One of the so-called Clark holdings was the East St. Louis & Suburban Railway and affiliated properties, and five years later he was elected president of that group. When these properties passed to the ownership of the North American Company he was continued in his capacity as chief executive. Now that the North American Company has bought into the Illinois Power & Light Corporation, Mr. Sawyer finds himself affiliated with one of the biggest aggregations of capital operating anywhere in the public utility field.

Advocate of Organization and Teamwork

He is an engineer-manager with a keen appreciation of the value of good public relations. He also has an enviable record in his management of men. Naturally as an engineer he recognizes the value of organization and of team-work, and he gets both, not by arbitrarily demanding them, but by careful planning and judicious selection of personnel.

This last year Mr. Sawyer had paid to him one of the greatest compliments that has come to any man in a profession akin to his. This was his retention by the government of Australia to inquire into the power supply there for the Victorian government. The story of that achievement by Mr. Sawyer has been told before in the Electric Railway Journal.

A keen mind, broad knowledge and experience are combined with a delightful personality, a generous and sympathetic understanding of human relationships, and a deep seated love and loyalty for his chosen industry. Bill Sawyer, as he is known to his host of friends, is a builder—a man careful in making decisions and fearless in carrying them out. The association and the industry may well look forward with confidence to the coming year with Sawyer at the helm.

Vision Without Being Visionary

Forty-fifth Annual Convention of the American Electric Railway Association Summarizes Progress Made in Solving Vital Problems that Confront the Industry—Renewed Spirit and Determination Bring Concrete Results

Cleveland City Council Escorted by the Late John Stanley Arrived in State on a Tally-ho to Open the Convention

RAILWAY executives, operators, manufacturers and guests thronged into Cleveland, Ohio, this week to attend the 45th annual convention of the American Electric Railway Association, which lasted from Monday, Oct. 4, to Friday, Oct. 8. Final registration figures are not available, but indications at last report were that the total attendance will run well over 10,000, or 25 per cent more than at last year's convention, which was the largest held up to that time.

In many other respects than in mere size was the convention noteworthy. For the first time in four years it was held away from Atlantic City. Greatly increased space for the exhibit was provided through the efforts of the city authorities and the Cleveland Railway. Consequently the display, both in size and in excellence, far exceeded anything that had gone before.

While the untimely death of President John Stanley of the Cleveland Railway, who had done a great deal of the planning and had taken no small part in the actual work of preparing for the convention, made it necessary to cancel the entertainment features, the convention was carried through with only minor changes in the program.

The programs of the American and the affiliated associations were replete with excellent addresses and discussions. The material presented was constructive and the topics covered vital problems of the industry. In this brief résumé only a few of the major points can be taken up. Full reports of the sessions of the American, Engineering and Transportation & Traffic Associations and abstracts of the papers and committee reports are given in this issue, while those on the Accountants' and Claims Associations will be given next week.

Although the convention was not formally opened until Monday morning many of the members and guests were on hand Sunday. The excellent facilities provided for placing exhibit material had made it possible to arrange the greater share of the displays on Saturday and everything was in place before the opening.

On Monday morning, promptly at 9:30, the 40-piece brass band of the Pittsburgh Railways marched into the arena of the auditorium and assembled on the stage. The City Council came in a tally-ho, under the guidance of Mr. Stanley. After the presentation of the new association flag and a short address of welcome the meeting adjourned to the hall where the sessions were held.

City Manager Hopkins' speech was more than an address of welcome. It was a serious talk on the topic of the morning, "Unified Transportation Service in the Public Interest." "In rendering this service you face difficulties," he declared, "that no other public utility faces, because you must render it in the face of those difficulties from which they are free. You have no control over the elements which affect your service and determine its qualities as they have. So it isn't strange that this service, which is absolutely fundamental to the life of any modern community and rendered with the most difficulty of any public service, is the least appreciated."

Frank R. Coates in his presidential address outlined the progress that has been made by the industry during the past year, much of which is along the lines laid down by Mr. Hopkins. Various phases of the problem were taken up by speakers representing city and interurban railway operation and manufacturing interests. All are agreed that good service must be provided and sold to the public. Modern cars as salesmen of the service can do much to attract customers, but they must be run in such a manner as to improve the transportation offered, was the opinion of the speakers.

Tuesday morning's session was devoted to the topic of street congestion. The high cost being paid for misuse of street facilities, the business of street management and traffic control and provision for the future were discussed by city and company men. Recognition of the city's responsibility for conditions and the essential service rendered by the street railways to the majority of the people was apparent. Widening of existing thoroughfares, separation of grades at intersections, building of subways and elevated roads will not solve the problem. The more room there is provided the more vehicles there will be clamoring for the privilege of using it. The ultimate, according to G. B. Anderson, would be when in the central district all the space is devoted to roadway and none to business.

Tuesday evening's session, which opened with a popular concert, was devoted largely to the report of the Advisory Council, which was presented by B. C. Cobb, its chairman. His view of the situation indicates that the view of the owners is becoming more hopeful; although much work lies ahead.

Management problems occupied the closing session, held on Thursday morning. The work of the committee on management and operation, which has attracted a great deal of attention throughout the industry, was explained by Chairman R. F. Carbutt and Regional Directors J. K. Punderford and W. H. Burke.

Several views of the motor bus and rail problem were given by leaders in the transportation field, such as Lord Ashfield, A. H. Swayne and H. L. Doherty.

A complete change of scene took place when the meeting was turned over to Chairman Edward Dana of the committee on education. The value of better knowledge on the part of employees as demonstrated by Prof. H. H. Norris and the group of foremen recruited from a number of railways will long be remembered by the audience as making a constructive step toward better management.

AFFILIATED ASSOCIATIONS DISCUSS TECHNIQUE OF TRANSPORTATION

As usual the members of the affiliated associations discussed vital operating problems. The engineers are proceeding with their work of investigation and standardization. They are, however, taking up these matters with a view to their influence on attracting car riders and forming favorable public opinion. The transportation and traffic men concerned themselves largely with merchandising of transportation and bus operation. The Accountants' Association considered the progress of the year in classification of accounts and of bus accounting, while the claims men took up better physical standards for employees.

A joint session was held by the Claims and T. & T. men on accident prevention and one by the engineers and accountants on engineering accounting and depreciation.

The elections of the various associations resulted in the choice of presidents as follows: American, Frank R. Coates; Accountants, L. E. Lippett; Claims, C. B. Proctor; Engineering, Daniel Durie; Transportation & Traffic, J. V. Sullivan.

President Coolidge

sends his greetings to the 45th Convention

DELEGATES to the last two midwinter meetings held in Washington remember the active interest taken by President Coolidge at both of those times. During the first session, at which time he was vice-president, he presented an address before the meeting, and at the next midwinter meeting, during his Presidency, he greeted the entire delegation on the White House grounds. This year he thoughtfully sent a message of greeting to the association through Mr. Storrs, its managing director, as follows:

WASHINGTON, D. C., Oct. 4, 1926.

LUCIUS S. STORRS,
Cleveland, Ohio.

Please extend to your association my best wishes for a profitable meeting. Public service in the truest sense of the word brings the largest measure of success, and I trust that the convention will continue the constructive work in the solution of vital transportation problems which has marked its previous sessions.

CALVIN COOLIDGE.

Make the Service Right, then Sell It

First Day's Session of the American Association Was Devoted to a Discussion of the Elements that Make Up Good Service and Methods Used to Bring It Into the Favor of the Public

UNIFIED transportation service in the public interest was the theme of the opening meeting held on Monday morning, Oct. 4. This theme was developed in a number of ways by the various speakers. All were agreed that the first requisite is to have the service of a type that will appeal to the present-day car rider. This calls for modern cars, good headways and reliability, along with courtesy to the rider and fair play to the community as a whole. Even with this, it is also necessary to let the public know that the product is good and to employ the best methods of salesmanship to induce them to become customers.

Of great importance in developing this theme was the address of welcome by City Manager W. R. Hopkins. In welcoming the delegates to Cleveland, he pointed out the essentiality of surface transportation for a great modern city. Only with its aid is it possible for the residents to live at great distances from their work. There are many factors, he said, which are much more difficult in the business of furnishing transportation than in that of giving other utility services, such as the supply of gas or electricity. Modernization of cars is to a certain extent beyond the control of the railway, since there are conditions on the streets and delays due to traffic which are inherent to the business. Then, too, when the purchaser pays 60 or more times a month, he is more likely to feel minor irritations incident to the service than when he settles only once a month, and then usually by check. Transportation is the poorest paid of all the utility services. Any of the others find it easier to make a profit. However, the speaker concluded that the public cannot well be served for a long time by a low quality of transportation, but given the proper service he feels confident that the necessary relief will be obtained.

President Coates in his annual address continued on the same theme. He outlined the real progress that has been made during the past year and the plans that have been prepared for continuing with even better work next year.

SELLING THE SERVICE

The sale of electric railway service was considered from two angles—city and intercity. Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad and other companies in the Insull group, considered the intercity viewpoint. In Mr. Budd's absence his paper was read by H. A. Johnson, general manager Chicago Rapid Transit Company. On this group of properties the desire to have the men become salesmen has been developed to the point that they are urged to sell anything the company has to sell. That spirit seems to be behind the entire organization. Frequent conferences of the men are held, so that they can interchange their views and become better acquainted with the purposes of the companies and what they are doing. A point made by Mr. Budd is that everything done by a public service company has a bearing upon the reception of its product. For this reason he held that everything done by the utility should be very carefully watched so that wrong moves will not be made.

FRANK R. COATES

Sales service from the viewpoint of the city railway was considered by Thomas Fitzgerald, vice-president Pittsburgh Railways. While there are differences in detail from the intercity service, the general principles are identical, said the speaker. Men with vision regarding the whole field should analyze all of the facts and from this analysis should select ideas which differ from the ordinary and which can be used to advantage in furthering the interest of the service. An open mind is needed, he averred. Many things which the railway operator considers impracticable may be worked out to the advantage of the company and of the public.

There is no doubt but that political leaders are just as vitally interested in doing what they can to make their cities go forward as are the utility men. They will in general be found reasonable and will be willing to work with the railways in the interest of better service, if they can be shown that the plans proposed really will improve conditions.

Mr. Fitzgerald admitted that in a number of cases public officials and others have made suggestions which were opposed by him and the other railway men. Instead of refusing to make the changes proposed, the railway did its best to try the methods and in many cases they have been found workable and have resulted in better service. The public and those who proposed the changes appreciated the efforts of the railway, so that much good was accomplished from a public relations standpoint.

Cars Make Good Salesmen

The value of modern equipment in selling the service was emphasized in two able papers, one by Samuel M. Curwen, president the J. G. Brill Company, and the other by Edwin B. Meissner, president and general manager St. Louis Car Company. Both speakers held that the car is the show window of the industry and that unless it is properly dressed the railway will not be able to attract patrons. Old-style cars fail to get the public into the habit of riding. Then, too, the many new devices and improvements that have been made in street cars during the past few years have greatly increased their possibilities for giving service. Exemplifying the value of attractive features and their influence on ride selling, Mr. Meissner told of what has been accomplished by the new Grand Rapids cars. Many other roads are now copying the attractive features of these cars and are finding that they are very valuable as business getters. The new cars seem to have a psychological effect all over the system. Other parts of the property are brightened up and the men take more interest in their work. As a result earnings have increased. However, with the 25,000 obsolete cars that still are in service, there is much room for further developments.

J. W. WELSH AND MRS. WELSH

Wickwire Introduces the Kahunavik

Following these somewhat serious talks on salesmanship, E. F. Wickwire, vice-president Ohio Brass Company, gave an example of salesmanship in one of his inimitable addresses. He characterized the Kahunavik, who, he said, was first aid to the Automotivik, as a person who stands as an obstacle to progress. The Kahunavik is not willing to adopt new ideas and is willing to allow the industry to drift with the current. In somewhat more serious vein, Mr. Wickwire told of a recent trip he made to Grand Rapids, and quoted comments by a number of leading men there showing the great value of the new cars and their results in changing the attitude of the public toward the railway.

Street Congestion—Let's Reduce It

Enormous Sums of Money Are Wasted Through Inefficient Use of the Streets, According to Speakers at the Tuesday Session of the American Association—Present Conditions Can Be Improved and Future Layouts Can Be Made that Will Give Relief

BEFORE proceeding with the regular business of the meeting on Tuesday President Coates said a few words in commemoration of the late John Stanley, after which the entire audience stood in silent tribute. A. W. Brady, T. N. McCarter, Gen. Guy E. Tripp and L. S. Storrs spoke briefly of Mr. Stanley and their regard for him, personally and in a business way.

Tuesday's session was devoted to the subject of transportation of the masses between their homes and places of work. This constitutes a major problem today, in the opinion of the speakers, and it was attacked from a number of different angles.

Col. C. O. Sherrill, City Manager of Cincinnati, Ohio, opened the discussion with a paper on the high cost of congested streets. He held the tremendous price the public is paying for misuse of street facilities has been overlooked by transportation men and the public generally, and should be considered. A parked car takes up space in the public streets worth perhaps $2,000.

The merchants have learned that all parking keeps business away and builds up competition in outlying districts. It was pointed out that a comparatively few automobiles, perhaps representing 10 per cent of the possible shoppers by auto, will pre-empt the available parking space so that others will not be able to drive their cars into the heart of the congested district. This means that other auto shoppers will be driven away and will do their purchasing in outlying districts. One solution suggested by Colonel Sherrill is that women shoppers should visit the congested district between 9 a.m. and 4 p.m. so as to escape the rush hours of morning and evening. Abolition of parking, he contended, will do much toward the solution of traffic congestion.

The essential service that is rendered by the street railways will serve by far the greater portion of the public. Since street cars carry so large a share of the purchasing population, they should have right of way over other vehicles. This will give recognition to the rights of the majority and will make easier the work of the transportation company in rendering service. The speaker worked out in considerable detail the ways by means of which the various traffic elements may be coordinated so as to get best results from our present street layouts.

Provision for future transportation needs was discussed by Col. Sidney D. Waldon, president Rapid Transit Commission, Detroit, Mich., and co-operation in transportation and traffic control by Major R. F. Kelker of Chicago. Abstracts of the papers by these two speakers appear elsewhere in this issue.

George Baker Anderson, manager of transportation Los Angeles Railway, believes that better, more scientific and more orderly use of the streets is necessary in order to keep pace with the present-day requirements. It is foolish, he stated, to use the streets for making deliveries of certain things during the day. Delivery of material can in many cases be made at night so that it will not interfere with the use of the streets for the transportation of people during the day.

With regard to the plans for increasing street widths so as to improve the traffic conditions, Mr. Anderson pointed out that it will be easy to reach the *reductio ad absurdum* when the streets are widened so that the downtown district is all street and no room is left for business purposes. He also stated that much good has come in Los Angeles from the restriction of pedestrians. Walkers are now made to cross the streets when the traffic signals are set for them. Jaywalkers have been practically eliminated. This has assisted greatly, he said, in speeding up traffic.

The duty of the railway men is to place the transportation problem before the city authorities, not as a problem of the railway alone, but as a problem of the community. The economics of transportation should be pointed out, he said, so that the authorities will understand that it is wrong to embarrass established agencies of public transportation for the benefit of a comparatively small number of drivers of private automobiles. Only in this way will it be possible to get the best results.

Conditions for Success Laid Down

B. C. Cobb, Reporting for the Advisory Council, Considers that Co-operation Between the Corporation, Its Employees and the Public Is a Cardinal Principle—Hon. W. Irving Glover Discusses Possibilities of Airplane as a Transportation Method

SUCCESS of the electric railway industry requires complete co-operation among the corporation, its employees and the public. This is a fundamental principle underlying the code presented by B. C. Cobb in reporting for the Advisory Council. Mr. Cobb's talk was a straight-from-the-shoulder presentation of conditions as they exist today in the industry, and the methods which should be used to improve them. While progress has been made in the solution of some of the problems and difficulties of great import that were seen last year, many things are yet unsolved and there are still many stony places in our pathways.

Mr. Cobb's report, unlike many addresses made on public occasions, did not mince words. He pointed out frankly and fully the status of the industry and showed that much remains to be accomplished.

Salesmanship is needed in the electric railway business just as much as in any other business, is the opinion of Mr. Cobb. The best salesmanship in this particular instance is a frank statement of the facts about the condition of the industry.

Hon. W. Irving Glover, second assistant postmaster-general, gave the address of the evening. He discussed the possibilities of commercial aviation. His experience in connection

At left, W. H. Sawyer and W. B. Potter. Above, C. S. McCalla, and at right, R. N. Graham, both of the Pennsylvania-Ohio Electric Company, Coffin Prize winner.

LUCIUS S. STORRS

with the air mail service of the post office department placed him in excellent position to discuss this topic. Commercial aviation, he said, will open up its own field of business, rather than replace any existing transportation agencies. The electric railways need have no fear that any air transportation company will seriously cut into the earnings of their business.

The session under the auspices of the Advisory Council was preceded by a popular concert by the Cleveland Festival Orchestra, led by Walter Logan, with selections by the Orpheus Male Choir, under the direction of Charles D. Dawe.

At the close of the session the award of the Coffin prize was made by President Coates to the Pennsylvania-Ohio Electric Company.

Good Management Can Solve Industry Problems

Possibilities for Business and Methods of Showing the Public Results of Good Management the Leading Issues—Relations of Motor Bus and Car Considered from Different Viewpoints —Education of Transportation Employees Demonstrated

PROBLEMS of management were considered in considerable detail at the Thursday morning session of the American Association. The session opened with a short talk by R. F. Carbutt, chairman of the committee on management and operation, who outlined the study that has been made by the regional directors and members of his committee in developing methods for better operation. If there is nothing in the material that has been gathered by these men but can be applied to a company, it must be more than 99.44 per cent pure.

Mr. Carbutt then introduced J. K. Punderford and W. H. Burke, regional directors, who outlined briefly what they had done in their respective districts. Mr. Burke stated that his district is practically free from the Kahunavik which Mr. Wickwire told about.

FREIGHT SERVICE PRESENTS OPPORTUNITY

Possibilities for the development of interurban transportation were discussed by T. A. Kenney, vice-president Hodenpyl, Hardy & Company. Originally the electric railways were built for passenger business, but with the advent of the motor car, these companies have had to find other ways of obtaining revenue. The results obtained have been very satisfactory in some cases. Mr. Kenney outlined a number of instances where freight business has become the backbone of the service.

Co-ordination of bus, tram and rapid transit lines was discussed in an able paper by the Right Hon. Lord Ashfield. In his absence it was read by J. McKinnon, superintendent of schedules London Underground System. His conclusion is that competition delays real progress and that it has no place under modern conditions.

A. H. Swayne, vice-president General Motors Corporation, feels that the motor vehicle industry has been of great assistance to the railways, as the loss of business has been made up by freight incident to the transportation of motor vehicles and materials for producing them by the railroads. As to whether the motor bus will replace the trolley, he said that the final answer is not yet known and that the picture is neither all black nor all white. We must, however, remember that this is 1926 and not 1900. He feels that the motor bus

E. C. FABER, BARRON COLLIER AND LABERT ST. CLAIR

B. C. COBB AND T. A. KENNEY

principles adopted by the association last winter are generally sound. The bus is a new transportation tool and should be used where it can be used to advantage. Management in working out the problem should have vision without being visionary.

Called on by the president, Henry L. Doherty, president H. L. Doherty & Company, made a stirring talk. He stated that he is becoming more and more of an optimist on the electric railway situation, not on the statistics, but on conditions that exist and which can be capitalized. If we should lose our entire investment, that would be a small matter compared with the loss to the community. It is entirely possible to make the city men realize that it is their problem rather than that of the electric railway man himself. It can be shown, according to Mr. Doherty, that railroad values are a mere bagatelle compared with what others stand to lose.

As an industry, we are in the business of furnishing transportation and always have been. We should take the tools that are available and use them.

INDUSTRIAL EDUCATION DEMONSTRATED

A brief brought by Edward Dana, general manager Boston Elevated Railway, discussed education of workers in the electric railway business. Mr. Dana reviewed very briefly the work of the committee on education during the past year. He then introduced H. H. Norris, educational adviser Boston Elevated Railway, who conducted a demonstration of a group conference of foremen. These men had been recruited from a number of electric railways and had received a small amount of instruction from Mr. Norris previous to the conference, which demonstration showed the value of getting men of this type to have a better knowledge of their work and to co-operate better with other departments.

Following the conference of foremen, the award of the *Forbes Magazine* public relations contest was made by Walter Drey. The material submitted in this contest, he said, was of exceedingly high grade. The winner of the first prize, which was a cup, was the Chicago Rapid Transit Company. Second honors went to the Pittsburgh Railways and third honors to the Pennsylvania-Ohio Electric Company. The cup was accepted by Harley A. Johnson, general manager Chicago Rapid Transit Company.

J. H. HANNA AND MRS. HANNA

E. B. MEISSNER

Presentation of the *Electric Traction* speed contest award was made by J. P. Barnes, chairman of the committee. The cup was awarded for the second time to the Galveston-Houston Electric Railway. The reply was made by F. L. Alexander.

G. H. Clifford, southwestern manager Stone & Webster, reported for the resolutions committee. Appropriate resolutions regarding the death of Mr. Stanley and the convention arrangements were adopted.

NEW OFFICERS INSTALLED

Mr. Coates next called to the platform the newly elected officers for the ensuing year. These were then installed, after which President Sawyer declared the convention adjourned. The new officers elected are:

President, W. H. Sawyer, president East St. Louis & Suburban Railway.

First vice-president, R. P. Stevens, president Republic Railway & Light Company, New York.

Second vice-president, James P. Barnes, president Louisville Railway.

Third vice-president, Paul Shoup, president Pacific Electric Railway, Los Angeles, Cal.

Fourth vice-president, J. H. Hanna, president Capital Traction Company, Washington, D. C.

Treasurer, Barron Collier, president Barron G. Collier, Inc., New York City.

Operating members of the executive committee to serve for three-year terms ending in 1929: Luke C. Bradley, president Virginia Electric & Power Company, Richmond; C. E. Groesbeck, vice-president Electric Bond & Share Company, New York City.

Manufacturer members to serve for similar terms: Harry L. Brown, secretary the Ohio Brass Company, Mansfield, Ohio; T. W. Casey, vice-president National Pneumatic Company, New York City; E. B. Meissner, president and general manager St. Louis Car Company.

Newly-Elected Officers of the American Electric Railway Association

Vice-Presidents:
1. R. P. Stevens
2. J. P. Barnes
3. Paul Shoup
4. J. H. Hanna

Treasurer:
5. Barron Collier

President:
6. W. H. Sawyer

New Members Executive Committee:
7. L. C. Bradley
8. C. E. Groesbeck
9. H. L. Brown
10. T. W. Casey
11. E. B. Meissner

Improved Service Based on Co-operation Among Affiliated Associations

Engineers, T.&T. Men, Accountants and Claims Men Are Working Together Harmoniously So that Their Companies Can Give the Public the Best Possible Transportation Service

PROCEEDINGS of the affiliated Transportation & Traffic, Engineering, Accountants and Claims Associations indicate a new realization that successful electric railway operation depends upon the united efforts of all departments of the organization. Undoubtedly the most outstanding impression created by the 45th annual convention of the American Electric Railway Association was that members representing different phases of operation realize better than ever before their mutual interdependence. Members of the Engineering Association are interested in ways by which their technical knowledge can be used to improve the quality of transportation service. Claims and transportation men are working together harmoniously to the end that the number of accidents may be reduced. Accountants are looking for ways by which the information they gather can be made most useful to other departments.

Specifically, the engineers are thinking how they can be helpful in selling transportation along the following lines: Improving the appearance of cars, making them more comfortable and convenient for the passenger, increasing the speed of operation, eliminating all unnecessary noise and insuring the reliability of power supply and the continuity of service. Also of great importance in the activities of this association has been the study of means of reducing the cost of operation. Other activities engaged the attention of the members of the Engineering Association to a certain extent, but it was evident that the chief interest lay in those subjects which promised to make electric railway service more popular. In short, if the electric railway engineer has not yet actually become a salesman of transportation, he realizes that he is the designer of machinery for producing a marketable commodity.

Transportation men showed by their attitude at the meetings of the T. & T. Association that they realize clearly the necessity to co-operate not only with other members of their own organization but with the outside world as well. As one speaker said, "It is the railway's job to be not only a good railway but also a good citizen and a good neighbor." At the joint meeting of the Claims and Transportation & Traffic Associations, mention was made of the fact that while a few years ago a transportation man and a claims man of the same company meeting on the street would hardly speak to each other, now it is common practice for them to visit in each other's offices and confer together nearly every day.

With the Accountants, too, co-operation has become a habit. Great interest centers in the subject of classification of accounts. Every effort is being made to secure uniform classification for railway and bus accounting in the various states. At the same time, efforts are being made to harmonize the many conflicting views concerning the best classification of bus accounts and develop a classification that will be satisfactory to electric railways, steam railroads and other operating agencies.

At least two association presidents remarked that the work of the committee and the meeting of delegates to the convention would be wasted effort unless the ideas were put to work in the operations under the control of the delegates. One president in emphasizing this matter further said there was too much printed matter and not enough discussion.

The material and thought growing out of the year's activities can be generally grouped into two parts. First, the committee reports completed and distributed a few weeks before the October convention are reviewed and abstracted in one section of this issue devoted to the Transportation & Traffic and Engineering Associations. The articles that follow are founded on the meetings held during convention week at Cleveland, and cover the presentation of reports by individual sub-committee chairmen and discussions that followed.

On the one hand the abstracted reports present the combined committee activities, while reported meetings give a cross-section over even a wider field.

There is a growing tendency for committee chairmen to present the reports along broader lines than by simply reading the verbatim report. By this means much information of an individual nature is presented that taken together presents a wealth of operating material.

Committee work has kept well abreast of the times and there is no immediate need for hasty decisions that might prove disastrous. But all problems are gradually focused and developed to a logical conclusion.

An examination of the exhibits, especially that of the 41 cars spread over 2,000 ft. of track, is indicative of results of much committee work. In the growing bus industry the work of the national bodies will prevent to a large measure the unfortunate and uneconomic developments that marked the early history of the electric railway expansion.

Engineers Consider Ways to Aid in Merchandising Transportation

Rolling Stock Improvement, Reduction of Noise in Car Operation, Prevention of Rail Corrugation and Reliability of Power Supply Aroused Particular Interest at Sessions—More Companies Urged to Follow Association Standards

WHILE part of the problem of merchandising transportation is purely the function of the Transportation & Traffic Association, a very considerable part of it is essentially the work of the Engineering Association. This was brought out clearly in all the sessions of the latter organization. In his presidential address Charles Rufus Harte stated that it is incumbent on the engineers to produce at the lowest possible cost a ride which will be as swift, quiet, comfortable and convenient as that furnished by the private automobile without the disadvantages attached to the latter. The growth and improvement of the automotive vehicle have given the trolley a competitor which may not show the dollars and cents operating efficiency of the latter, but which has captured the favor of the riding public to a considerable extent. That the supposed greater speed, comfort and convenience of the automobile are largely imaginary is little help to the trolley operators whose balance sheets show heavy losses on this account. So long as the public itself refuses to see the injustice of handicapping the trolley with fare regulations and with paving and similar burdens from which its competitor is almost entirely free, this can be remedied only by making the trolley ride sufficiently attractive to get the business regardless of economies.

PAST-PRESIDENTS
C. H. CLARK AND H. F. FLOWERS

Two main directions are open, Mr. Harte said. As yet there is nothing which at all closely approaches the trolley car in over-all efficiency for handling mass traffic, but it must be admitted that a considerable proportion of the cars now in service leave much to be desired in the direction of comfort. While there are yet savings to be effected in roadbed and overhead, the field which today offers the greatest opportunity for help to the industry is that of the rolling stock. Moreover, it is a field which cannot be left alone unless the industry is prepared to accept shortly heavy losses through forced abandonment of track and line.

The bus also demands careful consideration. With the number of electric railways using buses practically doubled during the year 1925, it is obvious that the bus does meet a demand, even though that demand may be an unwise one. On the other hand the doleful returns from much of this operation show equally clearly the need for improvement if it is to be continued. Again it is to our equipment men that we must turn for developments which will give better efficiency in operation.

These major problems carry with them a host of related matters. Noise, disturbing in itself, producing irritation on the part of the public and helping to turn riders to the quieter rubber-tired vehicle, is but a symptom of conditions which make no small amount of trolley riding uncomfortable.

Rail corrugation and noise in car operation go hand in hand, although the real relation is yet to be learned. Ventilation of automatic substations involves not only the losses and interruptions due to faulty behavior but also the noise, fear of which frequently leads to opposition to the economic location for the building. Trolley wire failures in busy locations cause traffic interference and publicity of a kind not to be desired.

Standardization and simplification are helps or hindrances, according to how they are done or administered. Year after year member companies at very considerable expense and inconvenience give the services of men supposedly best qualified to determine what materials, methods and practices will return to the industry as a whole the greatest dividends if generally employed. Year after year the recommendations of these picked men are reported at the convention, receive a more or less perfunctory consideration, if approved are included in the Manual, and are used by a part, but very often only a small part, of the membership. Why is this so? Are they too hastily adopted? Are the differing standards of some of the non-using companies really better? Or is it due to failure on the part of the companies to pay any attention either to the possible economies by their use or to what they really mean to the industry?

When standards or recommendations are issued, Mr. Harte urged that if they cannot be adopted outright, they should at least be given a fair trial. Unless valid reasons can be shown for non-acceptance of standards, they should be adopted and employed by all companies. If this is not done it is a grave question whether the committee activities are worth the cost. Abstracts of the reports of the affiliated associations appear elsewhere in this issue.

Way and Structures Discussed

Interest at Monday Session Centered on Causes and Prevention of Rail Corrugation, Switch Tongues, Welded Rail Joints, Crossings and Garages

RAIL corrugation, its causes and methods of prevention, was the subject of lively discussion at the Monday afternoon meeting of the Engineering Association. The report of the committee, presented by Prof. D. D. Ewing, brought out that there appears to be a relation between vibrations, noise and corrugation. Thus far the committee has collected a considerable amount of valuable data, but not enough to permit reaching definite conclusions.

J. Ormondroyd suggested that metallurgical analyses of corrugated rail would probably produce interesting evidence, and W. W. Wysor, chairman of the special committee, said that it was the intention to undertake such investigations in the near future. In reply to a question by L. C. F. Bellamy, general manager Hongkong Tramways, A. T. Spencer said that the *In-situ* process of rail treatment delays corrugation. E. L. Lockman stated that the sorbitic treatment and its relation to corrugation is being studied on the Boston Elevated Railway. Mr. Bellamy referred to experience of British tramways, indicating that sorbitic treatment prevents corrugation. Extensive tests made by the London Underground were mentioned by A. V. Mason, deputy general manager and the engineer. He was of the opinion that corrugation is caused by vibration. No trouble has been experienced on this system with rail treated by the *In-situ* process.

In reply to a question by C. A. Smith, Mr. Wysor said that the experience of the committee led to the conclusion that corrugation occurs on all kinds of track, but investigations have not yet been carried sufficiently far to determine on which type of track construction it is most prevalent. Mr. Ormondroyd was of the opinion that it was worse with rigid construction. On the Chicago Surface Lines, according to J. Wolf, all theories concerning its cause have been alternately proved and disproved. R. H. Dalgleish stated that experience with rigid track construction in Washington, D. C., indicates that rigidity is not necessarily a cause of corrugation.

In conclusion Professor Ewing said that it was his belief that corrugation is the result of a number of variables and that all of the causes mentioned may contribute to its occurrence. Until the investigations have been carried further, however, it will be impossible to determine which of these causes, or which combination of causes, has the most serious effect.

The meeting was opened by the address of the president, Charles Rufus Harte, who stressed the importance to the industry of adopting standards and adhering to them after adoption. The report of the executive committee and that of the secretary-treasurer were presented by G. C. Hecker.

Changes in the Engineering Manual were suggested by a special committee of which W. R. Dunham, Jr., was chairman. Approval of the recommendations was given by the meeting except in so far as certain specifications of other associations are concerned. On the suggestion of C. A. Alden, this section of the report was referred back for consideration by the incoming committee.

E. M. T. Ryder described the progress made by the special committee studying the design of switch tongues and hard centers for special trackwork. The cost of the suggested designs and the probable extent to which they would be used were discussed at considerable length. Mr. Alden expressed the opinion that they would cost no more than those now in use, and several of those present predicted that under such circumstances they would be widely used.

Work of the special committee on co-operation with the welded rail joint committee was the subject of a brief progress report submitted by W. W. Wysor. This had already been printed and distributed some time prior to the convention. Inasmuch as the way and structures committee is well represented on the welded rail joint committee it was recommended that this subject be discontinued as a special committee assignment.

Experience of the Boston Elevated Railway with welded rail joints was described in a paper by E. L. Lockman. He gave a historical sketch telling what had been done in the past by his company and outlining its present practices. F. B. Walker told of the experience of the Eastern Massachusetts Street Railway, stressing particularly its experience with welded joints in open track. He expressed an optimistic view of the situation and stated as his opinion that the rail joint problem has practically been solved.

A. T. Spencer presented the report of the special commitee on surface hardening of rails. Sufficient data have not yet been collected to permit the formation of definite conclusions as to the exact value of this process.

With the completion this year of a design for a steam and electric railway crossing below 45 deg. and to 30 deg., inclusive, the special committee studying this subject believes that the series of recommended designs is complete and recommended that the subject be discontinued. This suggestion was approved. On account of the death during the year of Victor Angerer, chairman of the special committee, the report was presented by E. B. Entwisle, who paid a sincere tribute to Mr. Angerer.

A progress report on arc welding processes for repairs to rails and manganese steel was presented by C. F. Gailor.

Design of buildings for maintenance, storage and operation of buses was the subject of a special committee report presented by John R. McKay. The danger of constructing garages with too large a floor area was stressed. In reply to a question, R. B. Harding said that the fire insurance interests consider 10,000 sq.ft. the maximum desirable floor area for buildings not equipped with sprinklers and 20,000 sq.ft. for those so equipped. W. H. MacAloney and Mr. Harte discussed methods of placing buses in a garage.

Reports upon electric railway carhouses and cars and on wood preservation were presented by H. E. Bachman and A. P. Way, respectively. P. J. Howe of the American Telephone & Telegraph Company emphasized the value of wood preservation as shown by the experience of large communication companies. H. H. George presented the report of the standing committee on way and structures, indicating the action taken on the findings and recommendations of the various special committees.

It is the recommendation of the committee on way and structures that next year two special committees be organized—one to handle the subject of design of buildings for maintenance, storage and operation of buses and the other to study the subject of design of joint railway and bus terminals. As previously assigned, the subject covers too broad a field for one committee to handle satisfactorily.

Depreciation Considered

Subjects Common to Engineering and Accountants' Associations Receive Attention at Joint Session on Tuesday—Noise Reduction Report Developed Lively Discussion

ONCE each year the Engineering and Accountants' Associations hold a joint session. This year an instructive paper on depreciation and obsolescence was read by Henry G. Riggs, professor of civil engineering of the University of Michigan. It appears in abstract elsewhere in this issue.

In discussion of Professor Riggs' paper, H. F. Brown made the statement that obsolescence should not be charged to present consumers, but the costs arising from this factor should be borne by future users of the service. E. D. Dreyfus, however, advanced the theory that sufficient reserve funds should be built up, depending upon the individual cases, as an insurance against major replacements due to obsolescence in the future. To this Professor Riggs replied that railway operation as a business was subject to drastic changes in operation and design and that he believed that such reserves should be built up.

At the opening of the joint session R. M. Rifenberick, consulting engineer, Toledo, read the joint report of the committee on engineering accounting. Mr. Rifenberick said that in the past there has been a tendency toward too extensive subdivisions of accounts, in an attempt to establish unit costs. It seemed desirable in past years to maintain accounts so that valuations can readily be made. Today this does not appear to be as necessary, and the committee recommends the discontinuance of further subdivisions of accounts as unworkable and too costly to obtain. Accountants have no way of obtaining the necessary information for further subdivision except through the engineers, and engineering departments have not been allowed the necessary funds to provide such detailed data.

After the close of the joint session the engineers continued with reports from their seven sub-committees. The outstanding thought characterizing the meeting was the desire to co-operate in furnishing superior transportation through the adoption of better engineering and maintenance practices. The urge for improvements is here and the engineers are prepared to meet it.

C. W. Squier, associate editor ELECTRIC RAILWAY JOURNAL, read the report of H. W. Codding on engineering symbols, which after discussion was adopted for information, but was not included in the Engineering Manual. Charles Rufus Harte, from the chair, reported briefly on the progress made by the committee on the Engineering Manual. The report of the heavy electric traction committee was abstracted by Chairman H. F. Brown. A report on equipment was presented by P. V. C. See. H. H. Adams presented the report on unification of car design.

H. S. Williams, in presenting the report of the subcommittee on the reduction of noise in car operation, told of an instrument that has been developed for the measurement of car noise. This instrument was described in this paper Sept. 11, 1926, page 413. Mr. Williams stated that much of the unnecessary noise could be avoided by superior maintenance. Gearing with worn teeth should be discarded. Bearing fits should be kept tight; axle bearings should be individually fitted to obtain the best results.

The report developed a lively discussion, in which H. E. Bean took up the desirability of eliminating track noises, first by remedying defects due to lack of maintenance and then by reducing noise by perfecting a better type of track with particular reference to paving construction. L. D. Bale called the attention of the committee to the suppression of machinery noise in recent substations constructed by the Cleveland Railway. H. M. Wheeler spoke of some tests made with canvas skirts and shrouds built of wood, but was not enthusiastic as to the results obtained. Prof. D. D. Ewing of Purdue University considered the subject of very great importance and one that should be taken up actively by the association.

A. H. ARMSTRONG, JOHN A. BEELER, J. M. BOSENBURY AND A. R. MYERS

H. A. Johnson told the association that the Chicago Rapid Transit Company had spent thousands of dollars trying to reduce noise on the elevated lines. Some of the attempts have been closer spacing of ties and use of 60-ft. rails at some locations. With reference to rattling noises, Mr. Johnson stated that this is generally the result of poor maintenance and can be greatly reduced without the expenditure of much money. Daniel Durie spoke of the work done by his company in reducing noise of various parts of the car unit. He believes that the use of helical gearing has reduced noise of operation.

The meeting was honored by the presence of members of the delegation representing the London Underground group. The session closed with the presentation of the report on wheel mounting and check gages, presented by C. W. Squier.

Engineers Study Power

Design and Control of Automatic Substations and Their Operation and Maintenance Occupied Thursday Meeting—Advantages of Mercury Arc Rectifiers Brought Out

BETTERMENT of electric railway operation with a view to improving public relations was again the dominating note of the meeting of the Engineering Association. A progress report of the committee to co-operate with the American Society for Municipal Improvement was presented by C. L. Hawkins. Continuation of this work next year was recommended. H. H. Adams offered a resolution of regret on account of the death of John J. Stanley.

Economics of automatic substations was the subject of a committee report presented by Adrian Hughes, Jr. C. A. Butcher discussed the relative merits of the cut-and-try method and the analytical method of determining the most economical number and location of substations. In order to assure reliability of service, he said that the number of substations used probably will be larger than is indicated by a purely mathematical solution of the problem. Praise of the work of this committee was voiced by J. F. Neild. How four independent investigations arrived at practically identical solutions of the problem of substation design and location in Cincinnati was told by F. W. Peters.

A brief report of the committee on purchases and stores was presented by Chairman P. F. McCall. The recommendations were approved.

Power generation and conversion then occupied the attention of the meeting for a considerable time. L. D. Bale presented the general findings of the committee and called upon various members to discuss the phases of the subject to which they had devoted particular attention. W. E. Bryan spoke on supervisory and remote control systems. George I. Wright told of the investigations made by the committee in connection with the use of the mercury arc power rectifier for electric railway service. Ventilation of automatic substations was discussed by F. W. Peters.

Co-operation Needed Between Power and Equipment Departments

On the suggestion of C. H. Jones, actual experience in the maintenance of automatic substations on the North Shore Line was described by C. Antoniono. A thorough inspection once a month is far more satisfactory than a casual daily inspection, in his opinion. Supervisory control in Baltimore was discussed briefly by Mr. Hughes. Mr. Jones spoke of a new installation of a carrier current supervisory control system on the Chicago, South Shore & South Bend Railroad. The equipment has not been in operation long enough for definite data to be available. Mr. Butcher referred to the loss of power efficiency due to the use of improper gear ratios on electric railway cars. Co-operation between the power, equipment and transportation departments is the solution of such a problem, in the opinion of Mr. Hughes. Mr. Bryan said that during the coming year the committee would study the question of efficiency, not only of the power generation and distribution system, but also in connection with the electrical equipment of cars.

Advantages of mercury arc rectifiers in the matter of quiet operation were brought out by Mr. Wright in the presentation of his section of the committee report. Mr. Antoniono told of the experience of the North Shore Line with a new mercury arc rectifier installed immediately before the recent Eucharistic Congress. The successful meeting of the severe test imposed at that time furnishes a good indication of its reliability, he said. C. H. Jones urged that railway companies make every effort to give rectifiers a trial. He said, however, that the characteristics of this apparatus are not yet sufficiently well understood to justify the establishment of standard ratings. Mr. Bale differed with this opinion. Foreign experience has been sufficiently extensive to justify the adoption of ratings in this country, he said. Mr. Harte urged that a standard be adopted as soon as possible. That the adoption of ratings would clarify the situation was the opinion of Mr. Peters, even though it might be necessary to change the standards at a later date. W. Neaf confirmed the opinion expressed by Mr. Bale and said that mercury arc rectifier ratings are firmly established in Europe. The chief difference between conditions there and in the United States is in the size of the load, rather than in its character, he said. R. L. Weber urged that ratings be made the subject of study by the committee during the coming year. Mr. Bryan assured the meeting that the committee would give careful attention to this matter.

Power transmission and distribution was the subject of a committee report presented by Mr. Jones. Owing to the lateness of the hour, there was little discussion of this subject.

The report of the committee to co-operate with the United States Department of Commerce on simplification and standardization was presented by R. H. Dalgleish. Mr. Harte presented the report of representatives on the main committee of the American Engineering Standards Committee.

Nominations of officers for the ensuing year were announced by L. C. Datz, chairman of the committee on nominations. The following names were submitted:

For president, Daniel Durie, general superintendent West Penn Railways, Connellsville.

For first vice-president, R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C.

For second vice-president, F. H. Miller, vice-president and general manager Louisville Railway.

For third vice-president, W. F. Graves, chief engineer Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis.

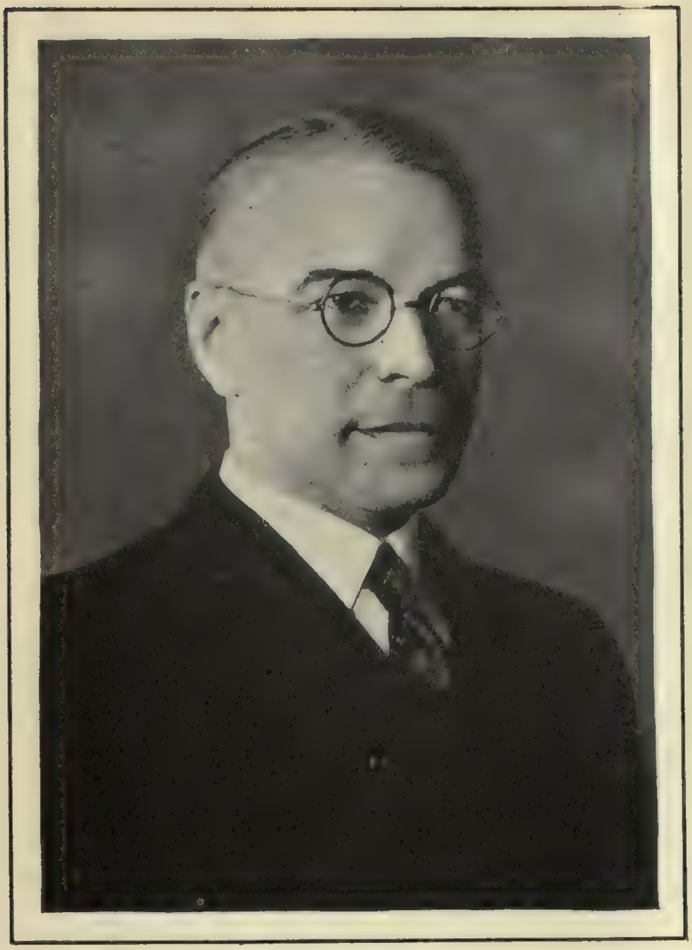
For secretary-treasurer, J. W. Welsh, executive secretary American Electric Railway Association.

Executive committee nominations were submitted as follows:

W. W. Wysor, chief engineer United Railways & Electric Company, Baltimore; L. D. Bale, superintendent of power Cleveland Railway; C. H. Jones, general manager Chicago, South Shore & South Bend Railroad, Michigan City, Ind.; P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, Akron.

All were unanimously elected. Speeches were made by the new officers and members of the new executive committee. A past-president's badge was presented by Mr. Durie to R. C. Cram in appreciation of his service in this capacity during the first part of the year. In the absence of Mr. Cram, G. C. Hecker accepted the badge. A similar past-president's badge was presented to Mr. Harte in behalf of his service during the latter part of the year.

Newly-Elected Presiden



DANIEL DURIE

DANIEL DURIE

SINCE 1916, when Mr. Durie took up active work in the Engineering Association, he has been quite closely affiliated with the different branches but has majored in the activities of equipment and transportation. A comparatively young man, Mr. Durie is no novice in railway work. His first experience was with the Paterson Railway, now a part of the Public Service Railway of New Jersey. In August, 1901, as a mere lad he went to western Pennsylvania to work for M. R. McAdoo at that time general manager of the Pittsburgh, McKeesport & Connellsville Railway and formerly connected with the New Jersey Company. Thus Mr. Durie took up his new duties with a company that has since developed into one of the most active in the country. This company is the West Penn System. Other than his service with the New Jersey company, Mr. Durie's entire career has been with the West Penn System.

Mr. Durie began as a wireman and assistant superintendent of the power plant at Tarr Station, Pa., on Aug. 22, 1901. His first job was to get some new cars ready for service and look after their maintenance. For a period following, Mr. Durie turned his attention to transportation matters, but the serious need of a man with high-class maintenance qualifications resulted in his return to the mechanical department. He was next made foreman of Iron Bridge carhouse and shops, and in 1904 was transferred to Connellsville, main shops, as repair shop foreman.

In April, 1909, he was made master mechanic of the entire system. From 1909 to 1913 additional properties were taken over and many cars, different in type, and carhouses and shops, varying in size and in the nature of their equipment, were added.

In June, 1915, the resignation of M. A. Coffey, superintendent of transportation, left a vacancy at the head of that department. Mr. Durie's general knowledge of the essentials in the various operating departments resulted in his promotion to general superintendent of railway operation. In addition he was on Oct. 25, 1917, made general superintendent of equipment.

J. V. SULLIVAN

JOSEPH V. SULLIVAN, assistant to the vice-president and general manager, Chicago Surface Lines, is the new president of the American Electric Railway Transportation & Traffic Association. His activities as a member of the Association's Executive Committee have been extensive. He has been chairman of the committee on rush-hour service, chairman of the committee on definitions, member for four terms and then chairman of the committee on fares and transfers, member of the standards committee, member of the committee on education and on accident prevention, chairman of the committee on subjects. During the past year he acted as first vice-president of the association and member of the committee on bus operation.

Mr. Sullivan was born in Chicago on Nov. 1, 1878. He was graduated from Notre Dame University in 1897 and then spent seven years in newspaper work in Chicago. His railway experience began in 1904, when he became connected with the traction companies operating on the north and west sides of Chicago, the predecessors of the Chicago Railways, as general passenger agent. He served in this capacity for one year and was then promoted to the position of general supervisor, which he held until the operating consolidation of the Chicago Railways and the Chicago City Railway in 1914 to form the Chicago Surface Lines. He then became statistician for the company. In 1920 he was promoted to the position of assistant to the president when he worked with John A. Beeler, who was then making an extended study of traffic conditions, equipment and organization of the Surface Lines. Thereafter he was closely associated with Williston Fish, general manager, in carrying out Mr. Beeler's recommendations and in bringing about operating economies and general improvements in the service. In 1924 he was appointed assistant to the Vice-President and General Manager Guy A. Richardson, a position which he holds today.

Mr. Sullivan has been a frequent contributor to the pages of ELECTRIC RAILWAY JOURNAL.

J. V. SULLIVAN

f Affiliated Associations

L. E. Lippitt

LAURENCE E. LIPPITT, manager of the Auburn & Syracuse Electric Railroad, Auburn, N. Y., who heads the American Electric Railway Accountants' Association for the coming year, is one of the youngest electric railway executives in central New York State, being only 37 years old. He began his career as an employee of the Oneida Construction Company, which electrified the West Shore Railroad between Syracuse and Utica, a line now operated by the New York State Railways. This was in 1906.

In September, 1907, he entered the employ of the New York State Railways and served in various positions in the accounting department. His next step up the ladder took place in July, 1913, when he was appointed auditor of the Syracuse & Suburban Railroad under the management of Allen & Peck, Inc. Three years later he became auditor-treasurer of the Auburn & Syracuse Electric Railroad under the management of Peck, Shannahan & Cherry, Inc.

He held this position until July 1, 1926, when he was named general manager of the company to succeed W. J. Harvie, resigned. The Auburn & Syracuse operates between Syracuse and Auburn and also lines in Auburn and to Owasco Lake, where it controls Lakeside Park.

Mr. Lippitt's activities with the Accountants' Association began in 1921, when he was appointed member of the committee on express and freight traffic promotion and costs. In 1923 and 1924 he served as member of the executive committee. In 1925 he was made second vice-president and during 1926 served as first vice-president.

Laurence E. Lippitt

C. B. Proctor

C. B. Proctor

IF C. B. PROCTOR, the newly-elected president of the American Electric Railway Claims Association, has a slogan it is: "Don't Use Unnecessary Words." And he lives up to it. His letters exemplify brevity with completeness. When he was asked for a statement regarding himself he said to the biographer: "Cut it to the bone; make it short and sweet," The most characteristic fact, perhaps, about Mr. Proctor's office administration is his thoroughness and the brevity of his records.

For more than 34 years Mr. Proctor has been identified with the claims departments of transportation companies. He has been actively identified with the affairs of the American Electric Railway Claims Association practically since the time of its formation. He has served in the capacities of third, second and first vice-president at different times, and in addition has been a member of the executive committee for a number of years.

For the past 21 years Mr. Proctor has been claim agent for the Memphis Street Railway, and since the early part of 1923 his work has included that of being joint claim agent for the Memphis Power & Light Company and the Memphis Street Railway.

He entered claims work in 1892 with the East Tennessee, Virginia & Georgia Railroad at Knoxville. In 1894, when that company consolidated as a part of the Southern Railway System, Mr. Proctor was transferred to Washington, where he remained for about 6 years as an executive in the freight claim department of the Southern Railway.

In 1900 he was made route agent in charge of the freight claim department for the Louisville lines of the Southern Railway, being transferred to Louisville, Ky., the headquarters of his office. He remained there for about 3 years and during the latter part of 1903 was reassigned to Knoxville as route agent for the same road.

On April 1, 1905, Mr. Proctor went to Memphis from Knoxville and took up there the duties of claim agent for the Memphis Street Railway, which had just been reorganized under the adminstration of the Ford, Bacon & Davis interests. There he has been ever since.

Transportation and Traffic Men Make Definite Suggestions

Valuable Material Contained in the Four Committee Reports that Deserve to Be Put Into Action by All Companies — George H. Clifford Presides Over Well-Attended Meetings —J. V. Sullivan Was Elected New President

RECOMMENDATIONS by committees that are brought to life only to be presented at the annual convention are of little value unless they are put into practice. Many valuable suggestions, representing hours of effort spent at considerable expense to member companies, are contained in the pages of the four reports representing the work of the Transportation & Traffic Association. Subjects covered were merchandising transportation, divided into six chapters; traffic congestion; accident prevention; and bus operation, which was treated under fifteen general subdivisions.

PAUL E. WILSON, E. F. WICKWIRE, JERRY STANTON AND GEORGE H. CLIFFORD

Both in the formal presentations and the discussions, definite recommendations were made that represent the best practices. The reports are drawn from outstanding companies and the thoughts contained are a veritable text of modern operation.

MERCHANDISING PLANS WELL DEFINED

"Take the ideas home and put them to work," was the meat of President George H. Clifford's extemporaneous address. Mr. Clifford further asked, "Do we practice what we preach and do we get the proper action in response to the work accomplished by the many committees that make valuable reports each year at the time of the convention?" Other points made by him follow:

Employees of our companies are entitled to know as much as possible, not only about the particular business in which they are engaged but about the progress that is mapped out by the committees at the time of the annual conventions. It is incumbent upon the delegates, if they believe in the reports, to carry the messages home to the many employees and salesmen of transportation in their own companies. All of the reports are made by men keenly interested in the work accomplished by the various committees this year.

Many of the committee members are men actively engaged in the operation of transportation properties, and these members and many others have taken valuable time to visit the operations of other companies. Their studies and findings represent a cross-section of best operating practices that should play an important part in bringing the transportation utilities to a plane of better service.

Many may disagree with some of the findings of a committee. If they do, now is the time to set these disagreements before the association as a whole so that the differences may be ironed out and the message representing the year's work of the association may be of the greatest value to the industry.

After the president's extemporaneous, yet well-pointed, address the meeting was turned over to the merchandising transportation committee, and its chairman, R. N. Graham, was called upon to preside. Mr. Graham emphasized the fact that the report this year was dogmatic in the extreme. "Must or should is used in all the recommendations," he said, but he explained that the individual opinions of members were submerged in the committee report where they were at variance with those of the majority.

Clinton D. Smith, in presenting the section of the report on special prices of service and rates of fare, declared that the rider who desires a superior service is willing to pay a higher fare if the service is satisfactory. A specific example cited by Mr. Smith was the "Ceramic Flyer" of the Steubenville, East Liverpool & Beaver Valley Traction Company. An example mentioned of special classes of service was the sale of transportation to the American Legion on the part of the Northern Texas Traction Company. In this case, the American Legion issued free transportation tickets which were presented by the Northern Texas Traction Company at the end of the convention and netted nearly $1,500.

S. E. Emmons presented the section of the committee's report on "Maximum Use of Existing Facilities." This is only another way, Mr. Emmons said, of expressing efficiency of operation. Recently 130 new cars were added in Baltimore and 111 old single-truck cars were retired. There is no single-truck equipment in Baltimore at present. As a result of these changes, passenger riding has increased one-half of 1 per cent, and while the car-miles have decreased 2.1 per cent, the seat-miles operated have increased 0.9 per cent. A $100,000 saving in operating expenses was accomplished by concentrating on these methods.

Company interest in civic problems was summarized by J. B. Donley, in saying that a railway company should not only be a good citizen but a good neighbor. The different members of the staff should belong to civic clubs, and the company should pay the dues. They should also enter into the work and discussions of these organizations as a good member might be expected to do. The local safety council should be the particular pride of the railway operating in the community.

The advertising theme permeated many of the talks during the session. A. C. Spurr was sponsor for that section of the report and declared that a brief message several times a week in the daily newspapers was better than a full page used a few times a year. Something definite must be said, but such topics are not difficult to find on the average railway property.

John A. Dewhurst saw in the car exhibit of this year's convention tremendous strides in the modernization of cars that were designed to appeal to the car rider. He referred to recent cars built in Paris and Berlin that appeared to be even broader steps toward the ultimate end of obtaining comfort and easy riding and the elimination of noise. A design along somewhat similar lines as the Paris and Berlin cars has been worked out in this country, but to date no means has been found to construct such a unit and to give it the acid test of operation. It seems inevitable that such a design will need at least a year of test and development before it can be turned out as a finished product, and it is to be hoped that some means will be found by which either this American design can be built or one of the European cars can be brought to the United States for test and study so that the coming year will not be lost to the art of better transportation.

Considerable time was spent in the discussion of the various chapters of the report. Jeff Alexander reported that the riding in Houston is increasing from 5 to 8.5 per cent over last year, and he lays it largely to the improved appearance of the cars.

George Baker Anderson told of the improvement made in Los Angeles in what he called the company's "stepladder" cars. The low-level light-weight cars now used with wide exits and automatic doors are a big improvement. The report was further discussed by G. S. Wills, C. E. Morgan, C. R. Havinghurst, executive secretary of the Beaver Falls Chamber of Commerce; Harry Mitchell, W. E. Wood and several other delegates who were present.

POINTED SHOP TALKS ON PUBLICITY

Following the close of the presentation of the merchandising report, Major J. S. S. Richardson gave a heart to heart talk on the value of advertising. He said: "If you only come to life in advertising once in a while, you'll have a fat chance to make an impression on the public when you want to." The railway or any utility must keep telling its message to the public and not give the impression that it advertises only when it wants something. Major Richardson's impressions are that many platform men know more about public relations and the handling of the public than the executives of their companies. He thinks as a whole they are a good lot.

Major Richardson told of the activities of many of the state committees on public utility information. A recent survey made by several of these committees of the courses on economics, as given in the grade and high schools of our country, is of particular interest. He said that the text books used were filled with false and misleading data, tending to promote public ownership, which we know too well means political ownership. Good work has been done by technical sub-committees, working under the general direction of these state committees and acting for several utilities in their relationship with the street programs of communities.

Louis Selzer of the Cleveland *Press* presented a paper giving his impression of four years of progress toward a better understanding between public utilities and the public.

Frank Le Roy Blanchard became so enthusiastic over advertising that he left his paper in the envelope and talked straight from the heart on the value of carrying a message continuously to the public. Mr. Blanchard believes there is much work to be done in advertising to draw the public away from the private automobile to the electric railways.

W. H. SAWYER, R. P. STEVENS and C. R. ELLICOTT

Joint Session Held with Claims Association

Traffic Congestion Report Based on Hoover Conference—Merits of Traffic Lights Discussed—Report on Claims Showed Ever-Growing Co-operation Between Transportation and Claims Departments

FROM comments made at the Tuesday afternoon joint session of the Transportation & Traffic and Claims Associations, the report of the Hoover Conference on highway safety appeared to be the most important single development during the year in connection with traffic congestion. Findings of this conference occupied a prominent place in the report of the committee on traffic congestion presented by A. R. Myers. An abstract of this report is published elsewhere in this issue.

That the recommendations of the committees are incomplete was the contention of Stanley Good, captain of traffic El Paso Police Department. He said that liability insurance for automobilists was urgently needed. Uniform traffic regulations are desirable but hardly feasible, he said. Police officers are preferable to automatic traffic signal control, in his opinion. Burton W. Marsh, traffic engineer Pittsburgh, Pa., said that unless it is put to some useful purpose, the report of the committee is no good. It should be subdivided, he thought, and the local railway men must push the various recommendations. Limitations of the height of buildings is a basic need.

Current discussion of traffic congestion is blind to the future in experimenting for an immediate solution, according to J. Rowland Bibbins, consulting engineer, Washington. An abstract of his paper appears elsewhere.

At the conclusion of the discussion of traffic congestion, G. W. Clifford, president of the T. & T. Association, turned over the chair to J. H. Handlon, president of the Claims Association. Mr. Handlon spoke a few words of greeting and stressed the growing co-operation between transportation and claims men.

S. W. GREENLAND

Hearty approval of the report of the Hoover conference was given in the report of the joint committee on accident prevention, presented by M. W. Bridges. R. H. Hadsell spoke of the good results obtained through co-operation between the railway and the local police. A note of optimism was struck by H. K. Bennett, co-chairman of the committee. He quoted figures to show the improved accident record of a large group of companies for 1925 as compared with 1924. More attention to the needs of the street railways might have been given by the Hoover conference, in the opinion of G. B. Anderson. He mentioned also the advantage of boulevard stops.

Accident prevention methods in El Paso was the subject of a discussion by Tom Walker. He spoke of the beneficial results obtained by bringing this matter strongly to the attention of the trainmen. More emphasis is needed on this phase of the work, in the opinion of L. H. Butterworth. G. B. Powell said that in Louisville it is the custom of the railway to accept the trainman's word concerning the responsibility for an accident. On a large property this practice is not feasible, in the opinion of A. J. D. Van Brunt. B. C. Wood described the methods in use on the Pennsylvania-Ohio System. He said it is customary to charge a trainman with three accidents for each failure to make a report as required. Seth Baldwin and Arthur G. Jack discussed other phases of the problem.

Traffic Men Learn About the Bus

Bus Operations Well Defined as Based on Practices of Many Companies Operating Buses in Conjunction with Rail Lines—Valuable Statistics Developed in Discussions

HOW, where and why to operate buses both in competitive and co-ordinated service was discussed in the report of the committee on bus operation. It is published, in abstract, among the committee reports in this issue. J. B. Stewart, Jr., chairman of the committee, read the general introduction to the report explaining the extensive work carried on by the committee during the past year. The idea incorporated in the report is to place the bus business on a sound basis so that it will not have to go through the trying transition conditions which proved disastrous to many electric railway lines.

Statistics on bus operations were given by Mr. Stewart, indicating the rapid growth in the use of the bus by electric railways. In September, 1925, according to association figures, there were 4,425 operated by 251 railway companies. In September, 1926, there were 6,439 buses, operated by 336 companies. These figures show a gain of 33.8 per cent in the number of companies operating buses and 45 per cent in the number of buses operated. Assuming that each one of these buses carried 300 passengers per day, the 6,469 buses transported 388,000,000 passengers per year. At an assumed gross revenue of $30 per day, the income from such operation approximates $77,000,000 per year.

E. D. Dreyfus of the West Penn Railways, Pittsburgh, discussed that portion of the report dealing with rates of fare on interurban buses. It was his opinion that the rate must of necessity be higher than on city buses. He gave as his reason the sparsity of population which would be reflected in low load factors. Long bus lines would not pay unless both terminals are cities having populations in excess of 25,000. As bus operation is normally a more expensive form of transportation than the rail car systems, the public must be educated to pay a fare adequate for the service.

At this point in the discussion, Mr. Coates, president of the American Electric Railway Association, was presented and gave the assembled delegates a brief talk on the successful work which they have accomplished.

That bus service should not be established unless it can pay its own way was the opinion of D. A. Scanlon of the Northern Ohio Power & Light Company, Akron, Ohio. It has been the policy of this company not to establish competing parallel bus service with its rail lines unless such bus service can show a profit from the start.

Original development of the bus business by independents was watched with considerable interest by steam and electric railway operators, said A. Shapiro, assistant manager Washington Rapid Transit Company. However, the use of the bus by the steam and electric railways has been rather backward. In establishing bus service, the steam and electric railway companies will no doubt enter into competition with each other. This may or may not represent a difficult problem. Mr. Shapiro told of experiences of the Milwaukee Electric Railway & Light Company in operating buses over approximately 900 miles of highway routes in Wisconsin. In this same territory, two steam railroads furnish both passenger and freight service. Up to the present time, however, neither of these companies has entered the motor transportation field. It was Mr. Shapiro's opinion that steam railroads could to advantage enter into agreements with electric railways for furnishing motor transportation in many competitive situations.

In the absence of S. W. Greenland, L. M. Bennett, Cleveland Railway Company, discussed that section of the report dealing with "terms of franchise." According to Mr. Bennett a franchise is a privilege granted by governmental authorities. He said that the street railway industry has an opportunity now to learn from the automobile and the bus industry. At the same time he feared that the bus industry had not taken advantage of the priceless lessons taught by the railway industry. Originally, the street railway fare was 5 cents, for no good reason at all. Early establishment of urban bus operation led to the adoption of a 10-cent fare for the same reason. The nickel of street railway fame was found to be too small for bus operation so the dime was substituted.

Chartered coach and bus operation was described by Adrian Hughes, superintendent of bus transportation, the United Railways & Electric Company of Baltimore. He explained that although his company had entered the bus business in 1915, it was not until the summer of 1925 that it went into this special business of a chartered service. The aim in rendering this service has been to develop the business not competitive with rail lines of the company. The company through purchase of independent operators acquired a charter for sightseeing business for Baltimore from the Gray Lines Association. The business so far has made use of equipment in off-peak hours which otherwise would be inactive. From the time service was inaugurated until Dec. 31, 1925, it showed a profit of $1,200. In the first six months of 1926 the gross business has resulted in a profit of $6,200 out of $74,000 taken in. Of this $74,000, $56,000 was derived from chartered business. Everything pertaining to the cost of this service is charged up to its operation.

Three divisions are set up for establishing cost data on this special and charter bus business. These are: the bus or bus year; the bus hour and the bus mile. Records are kept of all items of expense and are set up under these three divisions. From this study it has been possible for this company to establish the true value of bus operation. For the purpose it is necessary to divide the operation into two parts, i.e., competitive and railway. He showed charts to illustrate the allocation of costs and revenue between these two forms of operation. In 1925, the bus business operated by his company showed a deficit of $37,000. However, the competitive lines, i.e., those operating independently or in competition with the railways, showed a profit of $20,600. The railway bus lines, supplementing the rail lines, showed a deficit of $57,400. Hence, the deficit on the whole property was $36,800.

Better public relations can be developed through the use of the bus in establishing this service in the territories where it would be both impractical and uneconomical to build rail lines was the gist of the remarks made by C. H. Chapman, manager of the Connecticut Company. The bus fits into the general scheme of transportation as a means of trying out an extension of the parent system. Such service is particularly suited for tapping live communities which desire rail transportation. Mr. Chapman gave other examples illustrating possibilities of the use of the bus in completing a system of urban transportation. It was his opinion that the existence of bus lines will stimulate riding on the system as a whole. He warned the members that he was not subsidized by any bus manufacturer when rendering the opinion that in certain cases it may be economical to discontinue track operations and substitute buses if the company cannot refinance reconstruction of its roadway.

E. M. WALKER

Two fundamental principles governing successful bus operation were presented by A. T. Warner, assistant to the vice-president in charge of operations, Public Service Railway Company, Newark, N. J., who discussed that section of the report dealing with "steps to be taken to protect rate base with respect to development expense." One of these was that the company should not carry unsuccessful bus operations on the books for too long a period. The second principle was that a fare should be established at the time bus service is inaugurated which should be high enough to cover cost of such operation. In working out these two principles, his company takes a census of the territory which it proposes to serve with buses. A reasonable riding habit is prescribed from this census and then the rate of fare to cover cost of operation is established from this base.

J. B. Stewart, Jr., was again called upon to read the section of the report on tire mileage contracts. M. L. Harry, chairman of the sub-committee which prepared this chapter, included a brief description of the history which has led the tire manufacturers and operators to enter into such agreements.

Resolutions presented by the resolutions committee of the association included tributes to Mr. Stanley and Mr. Maltbie, two prominent electric railway officials who had died during the past year. J. V. Sullivan, president-elect of the association, was escorted to the platform and the gavel was presented to him by President Clifford. Mr. Sullivan reciprocated by pinning the badge of past-president on Mr. Clifford's coat.

Retiring Presidents of the American and Affiliated Associations

FRANK R. COATES
American

CHARLES RUFUS HARTE
Engineers

GEORGE H. CLIFFORD
Traffic & Transportation

JOHN J. DUCK
Accountants

JOHN H. HANDLON
Claims

Co-operation by All Transit Agencies Means Progress*

Transportation a Civic Necessity, and to Cripple Its Effectiveness and Power Properly to Function Would Hamper Seriously the Municipality as a Whole

By **Frank R. Coates**
President American Electric Railway Association,
President Community Traction Company, Toledo, Ohio

FRANK R. COATES

IN OPENING this, the 45th annual convention of the American Electric Railway Association, I have a feeling of pride in our industry, a pride which I believe is justified. A few short years ago there were those who professed to see the electric lines skidding into innocuous desuetude. Today, in this great auditorium, what do we see? The greatest convention this association ever has had, the greatest assemblage of transportation men, the greatest exhibit of transportation equipment and material. That's going some for an industry that was supposed, five years ago, to be due for the scrap pile.

Real progress in our organization work has been made by the thorough co-operation of the executive committee, the Advisory Council, the managing director, the headquarters staff, under the able guidance of the executive secretary; committee chairmen and committee members.

At the outset of this administration the Advisory Council recommended the discontinuance of the midwinter meetings, but to have territorial meetings in their place. The first one of these was held in Chicago in February, the second in New York during June. The discussions were behind closed doors, and from the excellent results obtained it is my strong recommendation that these be continued by future administrations.

During the year we have invited the committee chairmen to meet with the executive committee at each of its sessions. We feel that this has brought the committee work closer to the association and has been an aid to the chairmen. The continuance of this policy is recommended. Our publicity department has provided a series of eight talks on the electric railway situation, which have been given wide distribution among executives and public information bureaus, with the request that they be made the basis of public talks before business clubs, chambers of commerce, schools and, in fact, before any gathering where our representatives appear.

For the first time our association has been represented on the advisory board of the visitors' committee to the Massachusetts Institute of Technology. It is amazing to learn through this source how much thought and study are being given to the higher education of the student. It is my suggestion that the association appropriately express its appreciation to Dr. Sargent for having given it the opportunity, through its president, of placing the electric railways' problems before the Institute.

Executives or representatives of your association have appeared before all sectional meetings in the United States this year. It has gratified me especially to attend a number of these meetings personally. From each of them I carried away the thought that these meetings are of a very high standard and that real results are being accomplished. To prevent duplication of effort and to further our work for the common good of the industry there should be some tie-in between the sectional associations and the American Electric Railway Association. Your president mentioned this in an address before the Midwest Electric Railway Association, and it unanimously approved the idea. It is my suggestion to our executive committee that the president of each sectional association be invited to meet with the committee whenever it is in session. This would bring the organizations into closer contact. It is not the desire or thought to have the American Electric Railway Association dictate in the slightest degree to the sectional organizations, but simply to have a point of contact which will insure more perfect co-operation.

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*Abstract of an address presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

LOSS OF RAILS A BLOW THAT WOULD CRIPPLE THE COMMUNITY

There is no evidence at this time nor is there any probability that dense traffic can be handled efficiently other than by electric cars on rails. There is also a place for the bus. But we hear so much nowadays about tearing up electric railway tracks that apparently the proponents of these drastic measures never give any serious consideration to the needs of the future. We have been told in a number of instances that electric railway equipment should be junked and buses substituted. The politicians and leaders of public thought who advocate such a procedure in our larger communities would hand down to posterity a heritage which would so cripple transportation that the very growth and well-being of the community so affected would be dealt a paralyzing blow. Transportation is a civic necessity, and to cripple its effectiveness and power properly to function would be to hamper seriously the municipality as a whole.

Are we as transportation men doing our full duty toward offsetting this mistaken notion? Are we effectively and squarely meeting this issue? It is our duty in the community we serve to keep hammering away at the future necessity for electric tracks to handle mass transportation in our larger cities. If we do not, we are failing in our duty to our companies and to the public at large. We are failing just as wrongfully as those in positions of civic trust who, utterly unmindful of the future dire consequences to the communities they represent, would wreck the foundation of their transportation structure that they may gain some advantage, in their narrow-minded view, for their own political preferment.

AMPLE RATE OF FARE ESSENTIAL

It is unfortunate that we must fight these elements for our existence. Whenever there is friction there is waste. Fights and educational campaigns cost money, and yet in the majority of cases the attacker keeps calling for lower fares.

We cannot discuss service without considering it in relation to the fare question. Some people evidently think that everything else has a higher value since the war except city car fares. Every factor which goes to make up transportation service has gone up in price, yet there are a few communities in this country which that the user of the service is fixing the price.

Further, the rate should provide sufficient money properly to care for maintenance and depreciation, and for all obsolescence as well. In the vast majority of cases our American rate is a single fare for each ride. Usage may have established this, but it is not just. Why should the passenger who lives a mile from his place of daily labor pay the same as his fellow worker who lives 3 miles away? The latter is getting something for nothing, something for which the short rider is paying.

Consider the advantage to all property in a community when there is an adequate transportation system. The car rider pays for it. No man is more opposed to any branch of our government carrying on any business than my chief, Henry L. Doherty, but he has repeatedly stated that an adequate common transportation system is so necessary to every community and so essential to its growth and development that the payment of readiness to serve expenses of the transportation system could be justified as a tax on the property of the community. He has also held that the property owner would be better off paying these expenses as a property tax than to risk depreciated land values through retarded growth of the community, or failure to secure appreciation in land values due to natural growth. Under such a plan the car rider would pay only that portion of transportation cost which is based on the distance traveled.

This will undoubtedly impress you as a very cumbersome and unnecessary method of charging. However, it has such elements of equity that in my judgment some such method will ultimately become standard practice.

PARKING IS CIVIC WASTE

Our public streets were built originally to accommodate traffic. One would not think so today; most of them are used for automobile storage. Automobile drivers will park their machines blocks from their places of business and walk the remainder of the distance.

This matter is being discussed today from all angles. It is an expensive accommodation for the few to the detriment of the vast majority of the population in any city. The parking problem is not alone the business of the transportation company to combat, but it is a civic problem and should be cared for by the municipality. We should become aggressive in our local organizations to have the parking nuisance abated.

The street railway is a necessity. We were threatened at one time by the jitney. This form of competition held sway for a short while and then died out. Then came the buses. Their competition with the electric railways has reached its peak and is now waning. But in the bus is found something we can use to advantage. While as an individual system the bus cannot compete with the electric car under the same rates, yet co-ordinated with the electric system we have found a place for the bus where it can be used, and used to advantage.

MANUFACTURERS HELPING TO STIMULATE MODERNIZATION

The manufacturers of electric railway equipment have done wonderful work in modernization. We ask that their studies and development work be continued, with the twofold object of bringing about modernization and reducing costs. Thus, with the manufacturers working to accomplish the results suggested and the operator studying the situation and carrying out his advanced ideas on the underlying principles of co-ordinated service, rate of return, and meeting the opposition to the electric railway squarely and fairly, we will find the recognition for which we have been striving.

The steam roads are gradually turning toward the electrification of certain parts of their systems; they realize the possibilities and necessity for this form of transportation. And until something is presented other than that which has been offered up to this time as a substitute for the electric car it is in no imminent danger of being supplanted.

Electric Railway Service Can Be Sold*

In the Past Most Executives Have Overlooked Latent Power of Employees as a Selling Force—Better Business Campaign of North Shore Line Cited as a Practical Example of Methods that Can Be Used

By **Britton I. Budd**
President Chicago North Shore & Milwaukee Railroad
and Allied Companies

SELLING transportation service is a subject which has been engaging the attention of electric railway executives a great deal in the last few years. The old theory held by many that electric railway service, being a necessity was used only in case of necessity, and therefore did not require any special effort to sell it, has been generally discarded. Today I think we all agree that electric railway service can be sold; that is, that the operating revenues of our companies can be increased by well-directed sales efforts. I think we are agreed, also, that at no time in the history of electric railways has the need for intensive sales efforts been as great as it is now.

BRITTON I. BUDD

Being agreed, therefore, on the main propositions that properly directed sales efforts bring results and that the necessity for such efforts is pressing, the question before us is what are the best methods to employ.

I believe that most electric railway executives in the past have overlooked the potential power of the employees of a company as a selling force. I do not mean simply in the way of giving courteous, efficient service, which means the creating of good will and indirectly increasing business, but as actual sales agents. I wish briefly to sketch an experiment which we are trying.

On the North Shore Line we have an active traffic department made up of men who are experts in the line of selling transportation service. Such a department is a necessity for every company engaged in a line of work similar to ours. The experiment which we are trying out, of having all our employees act as sales agents, does not in any way take the place of our traffic department. On the contrary, it makes the work of that department even more of a necessity, for it follows up those "tips" of new business which the employee salesman cannot close.

The employee sales effort includes every one in the company and even members of their families. For example, the wife of a trainman has been responsible for a very substantial amount of new business and has been an award winner. All services of the railroad have been subdivided and listed as "products" which the company has to sell. The employees are urged to sell anything that the company has to sell, to comb their communities intensively for business and to take advantage of contacts with their grocer, butcher or dry goods man, or their lodge, club or other organizations.

To carry out this work a thorough organization was perfected. The movement was launched at the beginning of the year under the name of the "Better Business Campaign." The interest of every employee of the company was aroused. Seventeen separate teams, or groups, were organized, each one under a captain who appointed his own aids and subdivided his group into separate smaller units. A spirit of rivalry has been stirred up among the various teams, and individual and group money prizes were offered to the individuals and teams making the best showing.

Our employees' publication, the *Highball,* each month devotes pages of space to news of the campaign. It prints the pictures of the prize winners, feature stories about them and in every way helps to arouse and keep up interest. Group meetings are held almost daily and, in addition, circular letters are mailed from time to time to the home address of every employee. Members of employees' families are interested in the campaign through the employees' publication and the circular letters, so that the effect is cumulative and widespread.

DIFFICULT TO MEASURE VALUE

It is difficult to estimate the value of this campaign in dollars and cents. Both passenger and freight traffic increased substantially over the corresponding months of the previous year and it may be assumed that a part of the increase is due to the sales activities of the employees. In the first six months of the campaign, 4,954 business "tips" were turned in from employees, and to show how alive they are it may be cited that one piece of prospective business brought as many as five separate "tips" from as many employees.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

But the value of a campaign such as I have sketched is not to be measured by the amount of new business which might be traced to it directly. Its chief value lies in the enthusiasm it has aroused among the employees and the effect which that enthusiasm has in the various communities in which the employees live. When a company has a force of 2,000 employees, bubbling over with enthusiasm, talking about the company among their acquaintances and neighbors, such a company has a selling force the value of which is inestimable.

PUBLIC ADMIRES LOYAL EMPLOYEES

We know definitely that the campaign has had the effect of personalizing and popularizing the company in the various communities it serves. We know of merchants who have called their employees into conference and spoken to them on the spirit of the employees of the North Shore Line. We know that the campaign has increased the feeling of good will among our customers and that it has been worth while.

An important result of the campaign is the effect it has produced on the morale of the employees. The fact that the North Shore Line is subject to strong competition has been a factor in the success of the campaign.

Competition creates a company spirit. It puts men on their toes and makes them fight. They feel that business going to a competitor is a personal loss to them. They are alert to take advantage of every opportunity to get new business for their company.

A TRANSPORTATION SALES CONVENTION

Guided by our experience in the "Better Business Campaign" of the North Shore Line, we are preparing to carry out the same idea, perhaps on somewhat different lines, on the other railway properties with which I am connected. On Sept. 16 and 17 we held an inter-company convention which we termed a "General Transportation Sales Conference." The delegates in attendance were selected by the general managers of the North Shore Line, Chicago, South Shore & South Bend Railroad, Chicago, Aurora & Elgin Railroad, and the Chicago Rapid Transit Company.

We held two full-day sessions, beginning at 9 o'clock in the morning and lasting until 5 o'clock in the afternoon. The delegates were on company time and a full attendance was insisted upon. A program was prepared and definite assignments made in advance. Main papers were limited to twenty minutes and discussion to five minutes. A great deal of valuable information was developed which each delegate was instructed to present in summarized form to the employees in the department which he represented.

All the topics discussed at this convention had to do directly with the selling of transportation service. To give an idea of the scope and nature of the conference, a few of the main subjects may be mentioned:

A general review of electric railroad facilities in the Chicago metropolitan area.

Motor coach facilities in the territory of the companies represented.

Merchandise despatch and l.c.l. facilities and how business may be built up.

Carload freight business, interconnections with steam railroads, through rates, demurrage, etc.

Diner and parlor car business.

Concession business.

Good public relations as business builder.

Paid advertising; its purpose and how to make it effective.

Employee and customer publications; their purpose.

Publicity—what does it mean?

Speaking activities as a selling agency.

How can the "valley" in transportation be raised closer to the "peaks"?

There were in all 24 main papers on the program and each was discussed by from three to five speakers in five-minute discussions.

The main purpose of the convention was to give the representatives of each company a broader vision of the whole transportation problem in the metropolitan area and to point out ways of all working together for mutual benefit. The entire program was just another method of selling transportation service.

PRODUCT MUST BE CONSTANTLY IMPROVED

Actuated by the motive that it is necessary to have a constantly improved product, particularly in the merchandising end of it, we are working hard on another phase of the sales end of it even beyond the purely physical problem of providing still better tracks and equipment. We have inaugurated a service improvement program on the North Shore Line which has been in effect for some time, and with success, on the Chicago Rapid Transit Company lines.

First a careful survey was made by experts (1) to determine customer attitude toward the service and (2) employee attitude toward the customer. The employees are called together in small groups for a series of meetings and discuss, under the guidance of a trained director, practices which will lead to betterment of contacts with the customer and eliminate annoyances on the part of users of the service. In other words, they are developing, themselves, standards of practice not only for themselves to follow, but which will be the rule and guide for newcomers in the organization.

ADVERTISING—OF COURSE!

I am not going to say much about advertising—either newspaper, poster, billboard, car card, direct-by-mail, or the other forms which may be used effectively if handled by some one skilled in presenting sales arguments to the mass mind. To do that would merely be a reiteration of emphatic statements I have made previously on that subject. The company today, whatever it sells, that does not advertise efficiently will, I believe, soon find plenty of capacity in its old equipment. The competitor who knows how to advertise will have the business.

There are so many ways by which transportation service can be sold that I have not attempted to cover the entire subject, but only to point out two or three methods being tried out on our properties. In the last analysis, everything done by a public utility has a direct or indirect bearing on the selling of its product.

Of course, the best method of selling transportation service is to give your customers all and just a little more than they expect in the way of service. When that is done the selling is made much easier. When it is not done, when the service is open to serious criticism, the best selling methods known will not be entirely successful.

Winning Public Support

Is First Step in Selling City Service*

Every Employee Should Be Saturated with Information Regarding His Property and Should Broadcast It Widely

By **Thomas Fitzgerald**
Vice-President Pittsburgh Railways,
Pittsburgh, Pa.

THOMAS FITZGERALD

"WITH public opinion nothing can fail—against public opinion nothing can succeed." Whether or not this thought expressed by Lincoln is true, it is believed to be an entirely safe idea on which to base a campaign for selling street railway service.

The exact causes and effects of favorable or unfavorable public opinion have not yet been determined. The many obscure and complicated factors which work upon the mass mind make the possibility of a clear and convincing solution of the problem remote indeed. Certainly it does not lie within the ability of a single mind, beset with difficulties, problems and annoyances attendant in the operation of one comparatively insignificant street railway system, to analyze the relation of causes and effects in the fundamentals of this problem and convincingly demonstrate them to so tremendous an industry as the street railway utility. It would seem that the men who are best qualified to analyze and demonstrate the fundamentals underlying our industry are those whose work puts them in touch with the industry as a whole and not with any small part of it.

The officials of the A.E.R.A. and the editors of the journals devoted to the upbuilding of the industry are in an infinitely better position to analyze and demonstrate facts regarding our problems than any small group of men whose activities are localized in a comparatively insignificant part of the whole industry. It seems to be incontrovertible that the answer to the fundamentals underlying our local problems must come from men whose vision embraces the whole field. We as local men should supply them freely with whatever pertinent information we may have for the purpose of bringing out in a scientific way all of the available facts regarding cause and effect.

Incidentally it may be said that one of the most important influences upon the correction of erroneous conclusions and practices should be meetings such as these, where men from different localities can meet and by criticism and discussions demonstrate to the man with a mind open to ideas different from his own that there is a great opportunity to broaden his vision and to increase his usefulness to himself, his company, and his community. The moderately successful man, especially he whose success has created the conviction that the solution of his problems has been accomplished, should benefit by these contacts. If he is to be an asset rather than a liability to his property, changing conditions must find his mind open and receptive to suggestions, ideas and practices developed successfully elsewhere and which may be applied with equal success in his own locality.

First, then, it appears that the selling of service requires that every one connected with that service be saturated to the limit of his ability to absorb information, and it seems that the best way to secure and spread information is through free and full interchange of ideas through all available channels. This group, organized for the purpose of discussion and criticism of problems confronting every one of us, presents the most important medium.

KNOWLEDGE BREEDS UNDERSTANDING

The principal obligation of the railway representative is to see that his facts are stated as facts and his opinions as opinions. Placing the information before a group of councilmen or city officials is not an easy matter and frequently requires all the tact, patience and courage that a man possesses.

It is not enough that one man or one small group of men have knowledge of the facts regarding street railway problems affecting the public of a large community. Strive as hard as they may, a small group can spread very little knowledge in a convincing manner—especially to a large community whose people feel that their close physical contact with the street railway service qualifies them to judge the "facts" presented by the printed page better than a small group. This is particularly true if that small group is suspected of making little contact with the facts of the service. It seems almost an impossibility to bring the public to realize the value of street railway service unless the whole railway group or a large portion thereof bends every effort to dispense authentic information so that the public may come to an adequate understanding of the problem. The only restriction to be made upon the practical application of this theory should be that facts ought to be stated as *facts* and opinions stated as *opinions*.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

FREE DISCUSSION ADVOCATED

On the basis of this theory, with its one restriction, the officers and employees on one property have been invited by the management to discuss any of the company's affairs with any one. Two years of this policy have not presented a single incident embarrassing to the management, and it is believed that discussion of its affairs along this line has benefited public relations and will continue to do so without embarrassing results.

The trainmen, who make the greatest and most effective contact between the railway management and the public, offer the greatest single opportunity for the improvement of public relations. Whatever methods may be necessary to secure their interested effort to render good service and inform the public properly should be adopted. In one case representatives of the trainmen to the number of 80 or 100 and an equal number of street railway officials meet at frequent intervals for the discussion and criticism of operating practices.

GIVE NEWSPAPERS COMPLETE FACTS

Placing newspapers in possession of the complete facts regarding matters in which the public is interested offers a valuable field for efforts to inform. Their possession of all the facts quite often makes it possible to arrive at an amicable arrangement in matters of controversial nature without incurring premature animosities generated by public discussion based on inadequate information.

A concrete example of this policy with the newspapers was the amicable signing of a labor contract, during the discussion of which the newspaper men were informed by both sides and the situation completely explained to them. Where formerly there had been bad feeling and misunderstanding, in this case the newspaper men were convinced that the public interest was being served by allowing the two parties to proceed with negotiations without undue publicity. The final accomplishment was looked upon as the best solution to both parties under the conditions, and the newspapers proceeded to compliment both sides on the arrangement made.

CIVIC BODIES INTERESTED

Information should flow not only through the railway's personnel and news columns but through all forms of advertising—newspapers, posters on streets, posters on and in cars and billboards—any decent method of bringing before the public the facts regarding the street railway problems should be used.

It has been assumed that the attitude of the street railway men is that of a real public servant making every effort to accommodate his views to the desires of the representatives of the public and of the public itself. It would seem highly desirable that a city street railway man should look upon the public officials of his community as being representative of public opinion and to try in every possible way to comply with the suggestions and instructions issued by them. It is surprising how few detrimental suggestions are made or insisted upon by influential political representatives of the people. Suggestions, when complied with, carry with them a certain responsibility for the suggestor. It is pleasing at times to see the response of a suggestor to the idea that a sincere attempt will be made to carry out his suggestion successfully, assuming that he will take full responsibility.

LOCAL REGULATION MAY SOMETIMES HELP

In one case, at least, local regulation has been tremendously beneficial to a local street railway. In this case the character of the men composing the regulatory body is of the highest type—all sincerely interested in serving the public to the best of their ability. While there have been numerous disagreements and decisions adverse to the opinions of the street railway's management, still there has been none which impaired the rights of the stockholders, management or employees or in any way adversely affected the ability of the railway system to serve. A general survey will show that public good will gained by a local regulatory body has in this case rendered completely insignificant any differences of opinion regarding minor matters. While there have been no secret meetings of this board, publicity on controversial matters which might lead to misunderstandings has been avoided and, in all cases so far, the company has been able to accept the board's decisions.

With the sunlight of understanding illuminating street railway companies' practices, bad methods cannot survive, and the extent to which this understanding and free flow of information is accomplished, to that extent the details of operating and selling methods approach perfection.

LONG-HAUL RATES RESTRICT RIDING

One important feature in selling city street railway service is to recognize that it is fundamentally a short-haul service. When we try to sell long hauls we are opposing the natural functions of the facility, and to sell short-haul service at a long-haul rate seems to be the height of foolishness.

In most of our large cities empty cars may be seen on the streets and in the carhouses at the off-peak hours of the day. To sell those empty seats on the road for any small amount of money would increase the net return. There are people walking along the streets or staying at home during off-peak hours who would be glad to pay a small sum for the large amount of service which city railways are producing and wasting.

The speaker believes that the weekly pass offers the best present possibility for progress along this line. But until we have found some way of selling at a profitable price this off-peak by-product, there seems to be no justification for any one assuming to advise a group of electric railway men on the subject of selling.

Increasingly favorable public opinion, in spite of our failure, indicates the generosity of the public toward ineffective public servants. If we can find some way to become really effective public servants, who can predict the rewards which may be ours?

Street Management Needed in American Cities[*]

By G. B. Anderson
Manager of Transportation
Los Angeles Railway

GEORGE BAKER ANDERSON

STREETS have generally been created, owned and maintained by the state. Their purpose has largely been an economic one. In their use little control has been exercised until recently because their use was available on a basis of equality to every one; that is to say, economically the use of the streets was "free goods," like the air and other unlimited privileges enjoyed by mankind.

When the invention of the automobile made an individual vehicle available for every American family, effecting a revolution in methods of individual transportation, a different economic principle automatically superseded that of "free goods." This is the principle of economic value derived from scarcity. An exemplification of this principle is to be seen in the gradual change in the economic status of many natural resources. At first the land, water resources and like derivations of a rich and unclaimed world were to be had for the asking. As population increased, scarcity, relative to use, changed the economic aspect of these resources, and a more careful political disposition of the use of this wealth had to be set up. In the same way the streets will have to be subjected to a political disposition and control which is new and at present almost unthought of.

Speed in Transportation Is a Highly Valuable Element of Production—Properly Organized Control May Add Time with a Value of $2,000,000,000 Annually — Street Railway Managements Should Take Initiative in Placing Traffic Situation Before Their Public

Success to some degree has attended the efforts to secure, through the partial enlightenment of the public, what we now realize are for the most part palliative, temporizing measures only, but we seem about to enter upon a day when such measures will have lost their virtue, and when the complaisance of the public, largely still ignorant of the fact that it is the worst sufferer, must be disturbed. That disturbance inevitably will follow realization that the public is paying the penalty.

In these days speed in transportation is a highly valuable element of production. Rapid transit is a labor-saving and time-saving institution. It has become an economic necessity. Conservative Old World critics are amazed at and critical of the high speed at which most of us work and travel and think, but America's great lead in prosperity, the wonder of twentieth century civilization, is due very largely to the fact that by reason of such speed we hoe more rows of corn in a day and transport workers more miles in an hour than do the people of any other nation on earth.

The minutes thus saved each day to the average American, multiplied by the total population engaged in productive industry, run into a value of many millions of dollars annually, giving us the edge over other nations. If students of the problem have not been exaggeratedly enthusiastic in their estimates and conclusions, the additional minutes that might be thus capitalized under a properly ordered system of control over existing unnecessary impediments to the movement of urban traffic would have a cash value of not far from two billion dollars annually.

In May of this year President Coates assured the transportation and communications group of the Chamber of Commerce of the United States of the desire of the electric railways to co-operate with that body in bringing about a solution of the problem of street congestion that will promote the orderly progress of commerce and industry, as well as to insure the safety of the public and prevent the enormous waste of life, money and time that is being recorded each year. He said that he was urging the electric railway people to regard themselves not simply as electric railway experts but as transportation experts, so well acquainted with the transportation needs of their communities that they can say just what transportation the community should have. Their duty, he declared, is to give the community the best possible transportation advice.

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[*] Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

It is that plea for orderly progress that I am seconding. It is a plea for full recognition of not only the opportunity that presents itself but the obligation under which, being responsible for the safe, speedy and economical movement of the mass of people, we rest. To use a colloquial expression, we are all "sold" on the postulate that the prime cause of delay to traffic is congestion, and that the prime cause of congestion is the abuse of the privilege of the streets by vehicles used for the convenience or pleasure of private individuals, or minor special interests, as distinguished from their actual necessities.

MUST EXPEDITE "NECESSITY" TRAFFIC

Private enterprise in America has made unparalleled advances because of the executive genius that has been applied to it. The cause of our failure to exhibit a similar productivity in the operation of the public streets and highways lies in the comparative newness of the necessity, the widespread lack of understanding of the seriousness of the economic aspects of the problem and the control of regulation by transient public officials who are but incidentally concerned or interested, instead of by executives of thorough training and experience.

Urban highways have become one of the greatest productive agencies employed by the people. Their uses are sometimes conflicting, and some uses are more important than others. Recognition of this fact has resulted in the use by students of the qualifying terms "necessity traffic" and "non-necessity traffic." Those uses which are for the good of the community at large are classified as "necessity traffic" and are of highest economic value. Some uses are in the nature of special privilege from which gain accrues to individuals or groups at the expense of others, or of the community as a whole.

The paramount problem involved in mass transportation today lies in the tremendous increase of automobile traffic and the resultant congestion of the streets. It being manifestly unwise, undesirable and impossible to legislate the automobile off the streets, the question resolves itself into one of equity and economics. Any plan to be successful must be based on sound economic principles, with interference to public "necessity" traffic reduced to the minimum.

The first necessity of a community is that it must earn its living. The safeguarding of life and property is purely incidental to living. The workers as a mass, therefore, must receive first consideration as to the time of day when the necessity for their movement is greatest.

The functions of the city as a market center, with the consequent movement of buyers and sellers, must next be considered.

The movement of the wares of commerce is, of course, as necessary as the movement of the workers and of the buyers and sellers, but in general these movements are less rigidly confined to the time factor. Here is a vast field for reform. Many such movements could be made at night without serious inconvenience or loss, and to the great advantage of daylight movements which could not be assigned to the night period. The greater freedom of movement of commercial wares at night in many cities would in itself produce very large economies.

Closer control ultimately must be set up, with authority to insure the most economical use of the streets for the greatest good to the community. If such control, implying the arbitrary allotment of time and space, is to be classified as modern business, it must not be unscientific local political control, subject to the whims of changing administrations, which has resulted in the strewing of wrecks along the highways of transportation progress.

What apparently should be the next step is not advocacy of immensely costly extensions of street facilities, but rather a more intensive use of those we now possess, with possibly some minor additions of room and short cuts. By adopting such a program we will avoid the destruction of millions of dollars' worth of business structures, escape huge increases in our tax bills and thereby enormously increase the prospects of a continued well-being and prosperity.

Nor will the widening of existing thoroughfares, separation of grades at intersections, building of subways and elevated roads solve the problem. The more room there is provided the more vehicles will there be clamoring for the privilege of using it. The ultimate, in central business districts of the average city, would be a *reductio ad absurdum*—all roadway, no private business property.

That a political control is necessary under existing conditions seems obvious. The streets are public property whose use is not now governed by sound economic considerations. The state only has adequate authority to control for the public welfare. The reasonably satisfactory development arising from the establishment of the Interstate Commerce Commission and the state railroad commissions and public service commissions is an augury of the results that may be expected from these proposals. A controlling body should be composed of factors beyond the reach of individual or composite interests.

METROPOLITAN TRANSIT COMMISSIONS NEEDED

This political body may be designated as a "Metropolitan Transit Commission," to be appointed, preferably, by the state Governor. This origin, somewhat removed from local influence, combined with long terms of office and salaries commensurate with the economic importance of the problems involved, would do much to place the city streets in their true position as the most valuable material asset of the community.

Such a commission should have power to provide for an allocation of the use of the streets for the greatest economic welfare of the city as a wealth-producing unit, for the streets are community capital; that is, tools of production.

As an administrative body the commission should employ two main types of subordinates. The adequate functioning of the work planned would have to be based on full information in detail as to traffic conditions and requirements. Such knowledge is not to be secured by a tabulation of opinions, but by exact engineering fact-finding.

Likewise the enforcement work should be in the hands of the commission. Under police administration this work has had an almost exclusively punitive aspect. I believe that a better control can be maintained, both as to order and safety, if the educational work is emphasized. Street car companies have very greatly reduced the liability of their conveyances as a cause of serious accidents by making their trainmen responsible under an adequate system of safety rules. By the same analogy the scientific use of the streets secured by modern schedules on the electric railways might be extended to free-wheel vehicles.

The committee on traffic congestion this year presents numerous recommendations which in my judgment should be incorporated in a plan for action on the part of street railway managements. Most of us have probably been a trifle too diffident, or perhaps meticulous, to urge upon the constituted authorities adoption of curative or at least alleviative projects which our own analysis and experience have shown to be desirable, even necessary, if urban transportation is to be saved from descent into a chaotic condition. In view of the fact that quasi-public and some regulative bodies with little more back of them than a moral force, or power to lead public sentiment, are generally disposed to be guided to a great extent by the recommendations of street railway operators in matters pertaining to relief from congestion, it seems not illogical to assume that constitutional legislative and executive authorities might be similarly willing to lend attentive ears to programs advanced by the industry as a whole, representing as it does the best thought of experts with ample facilities for gathering and analyzing the facts.

Interest in Modern Equipment Opens New Possibilities*

By S. M. Curwen

President J. G. Brill Corporation

IN MY mind there is no subject which requires greater attention at this convention than the character of the rolling stock with which you will continue to provide that necessary commodity, public transportation. There is no doubt in my mind, and I don't believe there can be any in yours, but that every passing day produces further assurance of the permanency of our industry, and that no vehicle has been developed up to the present time which can equal the electric car in handling large crowds quickly, particularly in densely populated cities.

SAMUEL M. CURWEN

It therefore seems apparent that while parking restrictions and necessary regulation directed toward the private automobile and the motor bus will contribute their share toward improved conditions, the extent of the electric car's future utility will depend particularly upon the efficiency with which it renders service in keeping with the higher standard which the American people apparently are now requiring. Although the automobile has disadvantages as well as advantages, the public is educated to its higher standard of transportation comfort and convenience, and presents a problem for our electric railways to meet if this large and growing part of the public is to be rewon as patrons.

Great strides forward have been made by our electric railways in the adoption of improved power plant equipment, with which you are all generally familiar, and it is needless for me to say that throughout the country there are many instances where the possibilities for reduction in operating cost and increased patronage by the use of improved types of rolling stock are being recognized.

In discussing this subject of modern equipment, or possibly I should say more efficient equipment, for after all that is what it really signifies, let me remind you that practically every industry of importance throughout the world is striving to take advantage of the economies and increased efficiency resulting from the application of new devices or developments in design of equipment. By the introduction of new auxiliary devices and other improvements in motive power equipment the steam railroads have not only been able to handle longer trains faster, but according to public information based on the records of the past three years the Class I roads showed a saving equal to 20 per cent of their present rate of fuel consumption. For the first six months of this year this represented almost 10,000,000 net tons of coal and more than 198,000,000 gallons of fuel oil. It is evident, therefore, that the steam railroads appreciate the advantages in economy and service accomplished through modern equipment performance.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

Last year, during our convention in Atlantic City, Mr. McGraw called together a number of executives to reveal the astounding information that approximately 28,000 cars more than twenty years old were then in operation on the electric railways of the United States. While it was recognized that this condition was generally the result of increased operating costs and inadequate fares, the extent of deferred equipment replacements was a subject of much concern. It was felt, and has since been conclusively proved, that the continued operation of such equipment, whether it has seen twenty years service more or less, depending upon its type and condition, is economically unsound. Excessive operating costs absorb essential profits, thus resulting in unsatisfactory service and lack of appeal to the traveling public.

In order to overcome this drawback to the industry and to promote efficiency in car equipment, there was appointed a committee on essential features of modern cars to make an exhaustive study of existing conditions, and to recommend certain types of cars for both city and interurban service. The report of this committee has since been submitted and published in the technical press. While it is voluminous, it represents an exhaustive effort on the part of the committee and is deserving of the earnest consideration of every one interested in the welfare of the electric railway industry. Copies of this report, in book form, I understand, are available at the association's headquarters. Summarizing this report briefly, it has two important parts:

First, it recognizes the lack of reasonable unification in car design and the existence of needless variations in dimensions, weights and general arrangements. It recommends certain designs of cars for the different classes of service, and asks railway companies and manufacturers to agree upon them in the interest of efficiency and economy.

SUBSTANTIAL SAVINGS POSSIBLE

The advantages resulting from adherence to these uniform designs are, of course, quite apparent. In addition to savings through larger quantity purchases of raw materials, made possible by the uniformity in dimensions, reduced engineering expense, quantity production and elimination of numerous jigs, dies, etc., will result in lower selling price, quicker delivery, lower maintenance cost and the interchangeability of cars among various properties.

It is also important to note that the nearer equipment conforms to uniform designs the more acceptable it is for car trust purposes, thus making it more convenient for every company to take advantage of the more economically operated and attractive types of modern rolling stock.

Secondly, this report includes a number of outstanding illustrations of the results achieved within the past few years with light-weight modern cars, giving actual operating costs in comparison with the heavier obsolete equipment displaced. While these figures show returns on invested capital ranging from 13 to 65 per cent, I believe that with equipment built according to the uniform designs recommended, the results would have been even better.

The committee does not touch upon the subject of single-truck cars other than to state that, while the trend for the past few years has been toward double-truck equipment, builders are all prepared to furnish the Birney car wherever required and that nothing could be gained by attempting to select any additional types of single-truck cars for general use. As you know, the Birney safety car is the outstanding illustration of the possibilities of standard equipment. You have often heard of its economical accomplishments, and no doubt many of you enjoyed its economical operation.

TENDENCY TOWARD GREATER COMFORT

Since our convention last year purchasers of modern types of cars have shown a tendency toward deep spring upholstered seats, rubber tile floor covering, elaborate interior finish and other attractive features with which to stimulate their transportation business. Of course, the primary purpose of these innovations is to increase revenue passengers, and apparently the many instances in which they have been adopted is certainly evidence of the confidence of the railway officials that improved service conditions are important factors in increasing passenger travel.

While the committee on essential features of modern cars recommend certain designs and uniform dimensions, it does not restrict the manufacturer in construction details, but rather offers an incentive for increased activity toward progressive developments. The designs upon which operators and manufacturers are asked to agree are only the beginning. Progress is sure to be made. Further designs will be offered, all, of course, adhering to the lines of uniformity in fundamental dimensions in the interest of efficiency and economy. In closing, therefore, let me say that I do not believe there will be a manufacturer who will not welcome an adherence to uniform designs of cars not only for the opportunity which will be afforded for a more systematic process of manufacturing, but particularly for the advantages which these modern types of rolling stock will provide and the stimulating effect which these advantages will have upon the electric railway industry.

THE most progressive men in our industry are recognizing more and more that there is one outstanding fact which applies to every line of business and which our industry cannot escape, that no publicity and sales effort can be really successful unless the product itself is somewhere near right, especially when compared to the article with which it has to compete. And they are asking themselves: "Is our product what it really should be?" "Is our business an exception to this outstanding merchandising principle?"

—B. C. COBB

Transportation Service Presents Difficult Problem*

By W. R. Hopkins

City Manager, Cleveland, Ohio

I PRESUME I needn't tell you the fact that of all the public services, that branch to which you have devoted yourselves is by far the most difficult, the least appreciated and the poorest paid. Barring water alone, which is usually furnished by the city, surface transportation is the most fundamental requirement in the development of any modern city. There have been great cities without gas, without electricity, without telephones, but a great city, as we know great cities, would be absolutely impossible without surface transportation, not only on a large scale but at prices which permit its use constantly and daily by all of the population.

Therefore, the contribution of those concerns which furnish what we now call "mass transportation" is the fundamental, the initial and the most absolutely essential of all contributions to the development of the modern city. It has already made possible that one thing, permitting people to live at great distances from their work. As a matter of fact, it is with the development of the modern electric car that we began the development of modern American cities.

In rendering this service you face difficulties that no other public utility faces, because you must render it in the face of those difficulties from which they are free. You have no control over the elements which affect your service and determine its qualities as they have.

For example, the electric light company, the water company, the telephone company, the gas company, can carry their service directly to the consumer and can furnish it to him in his house, in his office, in his factory, without the interference of any other factor whatever. They have control of the ultimate delivery of their goods.

In your case, the user of your facility must come to you. In coming to you he must face whatever inconvenience is involved in a contest with the weather and with traffic, and when he gets somewhere near your vehicle he either must run to catch it or he must stand and wait for it to come to him. In the case of the street car, before he can get from the curb to your vehicle, he must run the risk of accident from traffic. In getting on your car he runs a further risk of accident, which is evidenced by the great sums which you pay annually for car-door and car-stop accidents.

In getting into the car and within the car itself he must encounter inconveniences from his fellow passengers, over whom you have no control at all, and sometimes from your employees, over whom your control is necessarily remote.

While he is waiting for your car he begrudges every minute that he spends in so doing. He postpones till the last possible moment starting for it, and from the time he starts until the time he leaves he is thinking only of the thing he wants to do and can't do until you have carried him to his destination.

So, all the time you have him on your hands he is impatient and almost an unwilling customer. Before he gets into your car he must hand over his fare first of all, and then, too, he must pay you 50 or 60 times a month. He buys his water, his gas, electricity, his telephone service, and he pays once a month at his convenience, and then mostly by check. In other words, you, at every turn, must not only reckon with and suffer from all sorts of factors and elements over which you have no control, but when you have done your utmost your passenger doesn't get the freedom from annoyance that other lines of business permit.

FUNDAMENTAL SERVICE LEAST APPRECIATED

So it isn't strange that this service, which is absolutely fundamental to the life of any modern community and rendered with the most difficulty of any public service, is the least appreciated. How many people seriously give any consideration to all the difficulties under which, of necessity, you render the service? Of course, the other thing naturally follows, that by and large this is the poorest paid of all public services. People pay for gas and for electricity and telephone service at rates which make all of those businesses uniformly profitable, and with very few exceptions all of the concerns in those lines of business find it entirely easy to pay large returns, larger than you have been paying.

It seems to me that this convention and this kind of thing represents precisely the thing that you need to do. The American people are not an ungenerous or mean people. By and large, unless they are provoked, or irritated or don't understand the situation, they mean to pay everybody a fair return for what he gives them. Any difficulties that may be encountered by public utility corporations are not due to any fundamental lack of generosity or fairness on the part of the American people. This great convention will give people a new notion of the extent to which this class of public service corporations are doing everything that is humanly possible to give the people the best possible service under the most favorable conditions and under the most favorable terms. In that work we are all interested because, after all, the public cannot be well served for long by underpaid service. The master who doesn't pay fairly for what he gets doesn't very long get the best that is to be had.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

Advisory Council Outlines Fundamentals of Success

Progress of Past Year Reviewed—Some Conditions Have Improved, but Much Remains to Be Done — Success Lies Largely with the Companies and Their Employees

Presented by

B. C. Cobb

Chairman Advisory Council American Electric Railway Association
Vice-President Hodenpyl, Hardy & Company, New York City

JUST one year ago this great organization, or rather representatives of this great industry—the electric railway industry—met in conference at Atlantic City. It was a great convention and our hearts were full of hope that the problems and difficulties that had been confronting and bothering us for eight years and more were beginning to be solved and put behind us. It is pleasing to report that since that time some effective work has been done and some progress has been made. There still are many problems yet unsolved and there are many stony places in the pathways we must follow. We are not, however, discouraged, for we can see some light ahead, but we would be dishonest and unworthy of our trust did we not frankly say that in order to solve our problems and smooth out our pathways we must have the earnest help and the continuous support of all of the people who use our service.

B. C. COBB

Our most difficult problem, in this age of automobiles, is the selling of our service to the people who need it, to the communities in which we operate. By this I mean getting the people to ride and the authorities to understand that a transportation company cannot succeed unless it earns a reasonable return on the value of the property used and useful in the business, after paying operating expenses, taxes, and the setting aside of rainy day reserves. Few electric railway companies are now doing such things, and yet the country is growing and is more prosperous than ever in its history. Such a condition is paradoxical and it does not seem as if it could continue.

In 1925 we boasted of carrying 16,000,000,000 passengers on our rail lines and buses, and we were looking forward to increasing this number in goodly measure during 1926. How have our hopes and prayers been answered? Not entirely to our liking. True, there has been some slight increase in the total number of passengers carried, but such increase has been almost entirely confined to the large cities. In the smaller cities the transportation companies have had hard sledding, for in those towns the ratio of private automobiles owned to the total population is much greater than in the larger cities, and this means, of course, greater automobile use per capita.

What are we going to do about it? My answer is, everything possible to sell our service, whether it be by rail or otherwise. Selling our service does not mean, however, simply buying new equipment and then sitting back and waiting for developments. It means much more than that—it means lively and continuous action all along the line; it means constant effort on the part of every officer and every employee to impress upon the people and their authorities the importance to them of public transportation; it means courtesy and attentive service, whether it be on a transportation vehicle, in the office, or elsewhere; it means telling truthfully our story in whatever way may seem best so that the people and those who represent them will understand our problems and therefore become ready and willing to help us. If they help us they will be only helping themselves. Surely, nothing could be fairer than that. It does not mean wearing a band of crepe on one's arm or carrying a sob handkerchief in one's hand. When that time comes, if it ever does, there will be only one thing left to do; that is, bury the corpse, no matter how painful the process may be.

In last year's report it was stated that automobile registration had grown from 450,000 in 1912 to 17,500,000 in 1924. It may be well now to say that this registration was approximately 20,000,000 at the end of the year 1925, and that probably December, 1926, will show the figure at upward of 22,500,000—just about one automobile to every five persons in the country. What 1927 will do remains to be seen. No doubt 25,000,000 automobiles will be the registration figure, and I hope it is, for we do not want our motor industry to suffer. Such a thing is unthinkable. It has become, perhaps, our greatest industry, and to have it hurt or be unsuccessful would be little short of a calamity.

We do, however, want the operation of all motor transportation more thoughtfully and rigidly regulated and controlled. No greater evil exists, and there is no more flagrant violation of the rules of the road than the present parking habit. Unregulated parking of vehicles is reprehensible in the extreme and sooner or later the authorities, the merchants and the people themselves are going to insist that business thoroughfares be kept free for travel at all times and during all hours of the day. Such regulation will, of course, help the transportation companies, and they surely need such help. It will not only do this but it will also help the shopkeeper, the pedestrian, and the automobile owner himself, who will gradually begin to learn that it makes for thrift and economy to use his automobile in a saner way.

Transportation by motor bus continues to grow. Much of such operation in the long run must prove unprofitable, and a great deal of it makes only for harm, because it is in many instances an unnecessary duplication of service. The regulation of such form of transportation by public authorities has only just begun, and while most of the states have enacted regulatory laws

Fundamental Principles established by the ADVISORY COUNCIL for the Guidance of the Industry

IT IS AN INCONTROVERTIBLE FACT that convenient, safe and dependable public transportation is absolutely essential, and that the success of such service requires complete co-operation between a corporation, its employees and the public; also that the revenue obtained from operation must be ample to meet all items of cost and permit payment of such a return upon the reasonable value of the plant as will induce the flow of new capital necessary for expansion and development. To accomplish this:

The companies must

1. Obtain the friendly co-operation of the public.
2. Establish a sound financial structure.
3. Adopt modern methods and equipment and sell their service in every legitimate way.
4. Give the best service possible with their income, and let the public know it through advertising.
5. Recognize that the private automobile is a competitor, and offer such class of service as will attract private car owners.
6. Control and co-ordinate with their railway systems bus operations throughout their territories and conduct an active campaign, openly and aboveboard, against the parking evil.
7. Have their executives always accessible to their employees and the public. Welcome suggestions made in the interest of the service, grant reasonable requests, and have a genuine interest in the welfare and progress of the communities in which they operate.
8. Above all else, give the fullest publicity to earnings and demonstrate to the public that if it wants electric railway service it must actively—and not passively—support it.

The employees must

Realize that their interests and those of the company are the same, and make every effort to be useful public servants in an honest endeavor to make friends for themselves and their company.

The public must

1. Favor a just system of regulation and consent to rates of fare that will make its transportation agent a solvent industry.
2. Understand that the best service at the lowest cost can only be obtained in a community through the operation of all public transportation by one efficient organization.
3. Realize that antiquated and burdensome taxes are reflected in the rates of fare; that the present system makes the railways act as tax collectors for the communities and states, and that the public itself will benefit by aiding in bringing about a more equitable taxation system by which the industry, in common with all others, will not be taxed beyond its ability to pay.
4. Realize that 75 per cent of the people use the public transportation service in their daily occupations, and insist that their authorities enact and enforce such effective traffic control that the public vehicles may have a relatively unobstructed use of the streets.

It seems to your council that the things fundamental to the success of the electric railway industry are substantially as outlined. There are, of course, a host of other things less fundamental which some may think should have been included in the list. Obviously, the prime essential for the success of the electric railways, as it is of any other business, is adequate revenue. Where it is secured practically all other things are possible, and it will then become easy to provide the best of service, with fine equipment excellently maintained, and do many other things that go to make a company popular. It is of prime importance that the management and the men should be in accord—that is to say, it is important that the entire organization should be working on a harmonious basis. The companies should give most careful consideration to the report of the 1925 Advisory Committee on Electric Railway Finance and to its recommendations.

The good will and active friendship of the public served is the greatest single asset an electric railway company can have. One of the most important elements in winning such good will is *courtesy*. This means courtesy all along the line from the president of the company down.

governing intrastate operation, nothing has been done as yet in the way of regulating buses and trucks carrying on interstate business. Undoubtedly, the Congress at its next session will take remedial action to cover this situation.

Most of the electric railways throughout the country have co-ordinated bus service to a greater or lesser extent with their rail service, and to the very great advantage of their patrons. The tendency, however, in this particular branch of our business is to overdo, i.e., give more service than the conditions warrant, and usually at a lower rate of fare than that which is compensatory. This is to be regretted, for it cannot long continue without harmful effect to the companies serving and likewise to the people served. Wink at it if you like, but the fact remains that unless cities are served by one co-ordinated, properly regulated, responsible, and financially able transportation unit, they will not get the service they are entitled to.

The axiom that he who would render service must have earning power is just as true today as ever. What we need is patronage and compensatory rates of fare. The fixed fare always was a mistake, and the 5-cent fare fixed by franchise agreements, ordinances or other contracts has been all but ruinous to many companies and seriously damaging to the communities they served. It is gratifying indeed at the present time to note the willingness of the public to pay more just rates. The average cash fare in cities of 25,000 or more was 7.70 cents on Sept. 1 last. The tendency of fares has been upward for some months, and I look for further acquiescence on the part of the public toward rates of fare that not only will meet the costs of rendering service but which will also provide for a return on the value of the property devoted to the public interest. In all our medium-sized cities, and in most of our large ones, I believe a 10-cent cash fare to be necessary. I do not mean to advance a hard and fast rule that 10 cents should be the rate of fare everywhere; I do mean, however, that the railway companies, for their own good and for the good of the public, should never again tie themselves to a fixed fare. Fares should be increased when the costs of providing service increase; and they should be decreased when the cost of rendering service decreases; but never below the point where they will meet all expenses and provide a return on the value of the property used in the business.

TRANSIT CONDITIONS IN NEW YORK CITY

You have read a great deal in the newspapers about transit conditions in New York City. It is a situation created entirely by politics. The metropolis of the country, which ought to have the best transportation in the land, has perhaps the worst. Human beings are herded together like cattle on the subway platforms, and crowded into the cars like sardines in a box. In no other place in the world would the people stand for such conditions. The authorities alone are responsible, and this means the politicians, who are not only cheating the railway companies but also cheating the people out of the service they are properly entitled to. There has been much talk lately, some of it propaganda and much of it irresponsible, about the abandonment of surface lines in New York City and their replacement by buses. I cannot imagine that such a thing will ever come about and if it does the people will rue the day, for their streets will become more congested than ever. In two of the most important automobile manufacturing centers in the country the automobile manufacturers themselves have only recently strenuously opposed the abandonment of rail service.

I think most all city railway systems, that is to say railway systems in cities of any size, will be successful notwithstanding their many present difficulties. I think also that some of the interurban railways will be successful, and on some of them at the present time tremendous sums of money are being spent in the way of development and improvement. Many of them, however, should not have been built at all, and if they do not succeed and are sent to the scrap pile they will be only paying the penalty for past lack of wisdom.

DON'T CONCEAL UNPLEASANT FACTS

Surely it would be a great mistake for the industry, through its officers and leading representatives, to tell anything other than the facts with reference to our progress. It would be misleading to say to the public that the railways are fast getting into better shape, for such is not the general condition. We have accomplished some gains, but at a price. We are rendering co-ordinated service, but we are not making the profits to which we are entitled. Far better for us to state the facts to the public, depending on the fairmindedness of the people to render us the help which we ask almost solely for the public good. If we do this, and continue along such lines, we will not only get help from the people but also help from the bankers through whom we must to a large extent finance.

We need salesmanship in the electric railway business just as much as it is needed in any other business, and to my way of thinking, as I have just stated, the best salesmanship in this particular instance is a frank statement of the facts about the condition of the industry.

Some people may think these remarks are pessimistic. If they are analyzed, however, they will not be so considered, for the underlying thought—in fact, the plain statement made—is that the people need electric railways and that electric railways will continue to serve them. If the people want to keep them, however, they must be awake, and this means foster and support them, giving them always a square deal and demanding only such in return.

Previously reference was made to what the employees of a company can do in a helpful way to promote the interests of the company by which they are employed, and this brings to mind the very human thought that the employees, the management, and the public should be tied together by closer bonds.

FUNDAMENTAL PRINCIPLES OF SUCCESS

Your council has tried to keep in close touch with the many troublesome problems of the business, and has established a set of principles which it thinks are fundamental in making the industry successful. These principles are being broadcasted throughout the land. They are given in an accompanying panel.

These principles we place before you as the *fundamentals of success* in your industry. Let me urge upon you not to regard them as so many words put together for the sake of saying something to which everybody agrees; instead, let me urge that you take them seriously, that you make them your code for the conduct of your affairs, that you use them for all your dealings with the public and your employees. If they, or any other set of principles, are to be effective, they must have lively animation as well as pronunciation.

The Kahunavik

First Aid to the Automotivik*

In One of His Inimitable Speeches the Chairman of the Committee on Co-operation with Manufacturers Tells of Need for Enthusiasm and New Thinking if the Industry Is to Progress

By **E. F. Wickwire**
Vice-President Ohio Brass Company

E. F. WICKWIRE

YOUR committee on co-operation with manufacturers works in close harmony with the association's general publicity committee, through the director of publicity, Mr. St. Clair. An outline of the activities of the committee during the past year is covered in a separate published report. While this combined effort has been productive of good results, yet we believe the association could advance the interests of the industry a great deal more rapidly if it had the whole-hearted co-operation of every manufacturer and every railway operator.

It is hard to estimate the detrimental effect of those who have so little faith and enthusiasm for the future of their business that they say to themselves, "Oh! what's the use," and fail to respond. Some one has suggested that we coin a name for that type—like the butler who called the Duke "Your Lordship" and the Admiral "Your Flagship." Until a better one is suggested, your committee suggests "Kahunavik." But send in your suggestions—we're going to give a prize for the best name. I suppose somebody will suggest that we call the fellow who *is* co-operating "Lux," because he doesn't shrink from his duty. For the benefit of those who may be long on electric currents and short on current events, it might be well to explain that the name Kahunavik is derived from a tribe in Hawaii which believes in the power of a native priest, known as the Kahuna, to pray them to death. When he aims his prayers at one of the tribe, the poor victim just curls up and dies, without a struggle.

There seems to be a similarity between these misguided Hawaiians and those in our own industry who have accepted, without argument, the statement of that rabid advocate of "Ride on Rubber," the "Automotivik," who has been shouting: "The electric railway is doomed. Motorized transportation is the only thing."

The Automotivik has pointed his finger at us and read the death sentence. The Kahunaviks seem to have closed their eyes to the facts and they have quit struggling. They need some of the fighting spirit possessed by a friend of mine who has always wanted twins. He has come within one of it eight times, and refuses to be discouraged.

The unfailing symptom of a chronic Kahunavik is his ability to find objections to everything constructive. For instance, there have been some objections that the publicity material sent out from headquarters does not exactly apply to certain specific local conditions. This general publicity material is intended to supplement rather than take the place of your local publicity work, and the idea is to use extracts which do apply, rather than accepting or rejecting the material as a whole.

A short slogan will often make a greater impression on the public than reams of literature. With this thought in mind, of quickly catching the public's eye, a hosiery manufacturer put out this slogan:

"Happiness Hose—for Contented Calves."

And the Grand Lodge of Graduated Grass Widows is attracting new members with this motto:

"What Good Is Alimony on a Cold Night?"

We are planning to try out a few slogans—some of them in question form, which we might call "Trolley-Queries." Here is the first attempt:

ISN'T A TROLLEY TRIP WORTH MORE
THAN A HAT TIP?

Our idea is to try "wooing" the public in the good old-fashioned way—by "popping the question" to them. Maybe we'll catch their eye quicker if we call these questions "Trolley-pops."

Lately I have heard more than one thinking railway man express the belief that if our industry is going to hold its own, to say nothing of going forward, we must inject into it more of the same fundamental merchandising principles that have been successfully applied by other businesses. That the trade we are trying to sell will respond, in more or less degree, to the same treatment that we do when we buy something —whether it happens to be an automobile, an office desk or a gas stove.

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*Abstract of a paper presented at the Annual Convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

The only modern thing I can think of that sells well because it looks ancient is new liquor in old bottles —and there again the bootlegger knows the sales value of appearance and carefully sprinkles dust on the bottle.

Other lines of business are cashing in on the appeal of appearance. We are trying to sell the same public as these other merchandisers and we are asking the platform men to be transportation salesmen and take more pride in their calling. It is true that we have given them improved equipment to a certain extent, but many railway men are commencing to be convinced that, as compared to other lines, we have not gone far enough by a long shot.

The most progressive men in our industry are recognizing more and more that there is one outstanding fact which applies to every line of business and which our industry cannot escape, *that no publicity and sales effort can be really successful unless the product itself is somewhere near right,* especially when compared to the article with which it has to compete. And they are asking themselves these questions: "Is our product what it really should be?" "Is our business an exception to this outstanding merchandising principle—the appeal of appearance—upon which people in other lines are so keenly concentrating their effort nowadays?"

Like the restaurant man, railway operators are realizing more than ever that while they can satisfy themselves on the solution of technical problems, the success or failure of their merchandising methods is in the hands of the public. Even the humble hot dog merchants of America have been doing some research work along these lines. They seem to be making money in spite of the fact that all the component parts of the delicacy—rolls, tights and horse meat—have gone up in cost. Nevertheless, it is claimed that there are more hot dog stands than trolley cars and more hot dogs sold than trolley rides—and mostly at higher prices. Yet is there really more value in a 4-in. hot dog than in a 4-mile trolley ride? That's another "Trolley-pop."

Everywhere we turn we see striking examples of how this fundamental principle of selling has been applied by other lines of business which appeal to the same class of trade. Movies, for instance, used to charge 5 cents, and the old movie houses were just about as comfortable and attractive as a 1910 model street car— and lots of people used to go to the movies to look under the seats for gum. More attractive theaters don't make the pictures any better, but they do make it easier to sleep through a poor one and more pleasure to watch a good one.

All of these illustrations tend to demonstrate that the most successful business nowadays recognizes that it must study its patrons and adapt its appeal to the way the public *does* react rather than to the way it *should* think and act. By constantly analyzing the reactions and requirements of their patrons the progressive merchants have been able to keep pace with changing tastes and they are continually seeking and finding ways and means to appeal to people's spending instincts. Progressive railway operators are expressing the belief that our industry should put forth strenuous efforts to make more rapid strides along these same lines.

One of the outstanding obstacles has been the fact that so many unscrupulous office-seekers have fooled the public by pledging themselves to "save the poor 'peepul' from financial suffering" at the rate of a penny a ride reduction in street car fares. Yet that type of politician doesn't hesitate about spending money freely to ride into office. He sheds "crocodile" tears at the appalling thought of the "plain peepul" paying a penny's increase for car fare, but the same fellow, after election, finds no difficulty in disposing of thousands, and even millions, of the people's money—without shedding anything but a few drops of ink.

LESSONS FROM GRAND RAPIDS

Like most of you, no doubt, I had heard some favorable comment regarding the new and unusual equipment placed in service in Grand Rapids. Recently I was in northern Michigan on a hunting trip (can y'imagine me hunting—anything but golf balls?). Coming back through Grand Rapids, I took advantage of the opportunity to look around and see for myself what impression the new equipment was making. While I was there I picked up some of the many letters that have been coming in to the company. There is only time to quote briefly from a few.

The Mayor of Grand Rapids makes some complimentary comments and finishes with this statement:

> Street cars undoubtedly offer the safest place in our streets. We know where they go—they can only run on their own rails. . . . We all ought to patronize the electric rail coaches and show our appreciation of the good work the street railway company is doing.

A State Senator writes:

> The most comfortable ride I ever had was on the new electric rail coaches. . . . The charter should be amended and the railway company not compelled to pave between the rails. Why should the street railway pay for paving between the tracks for me to run my auto on?

The Chamber of Commerce president says:

> It was a pleasant surprise to me to see the leather seats and air cushions and enjoy their comfort. . . . With these new coaches in service, there is a tendency for people to leave their autos at home and ride these comfortable coaches to and from their work.

You'll notice that he particularly mentions the leather seats, about which some fear has been expressed that the upkeep will be higher. This doesn't seem to worry them, especially if it's caused by increased wear and tear. They never have heard of any railway getting into financial difficulties from excessive seat abrasion.

Before reading the next and last one, I'd like to ask you a question, in all frankness. How many of you can imagine old and prominent families feeling complimented by having new street cars, of traditional design, named after their forefathers? Here's a letter which shows how much public sentiment changes for the better when car design changes for the better:

> We appreciate very much the honor bestowed upon us in naming one of your cars after our grandfather, William T. Powers. And in loving memory of our mother, his daughter, and as his grandchildren, we wish to thank you, and assure you that it will be a constant reminder of his cherished memory.

And it's signed by the whole family of grandchildren. Naming the new cars after old settlers has made quite a hit. But we must keep this fact in mind: it is not simply that the cars are new, but that their design is new—and better. They found that it wouldn't cost much more, but it was worth a whole lot more to get cars which possessed such desirable features as quietness, quicker acceleration, exceptionally low step and an inviting interior with a clean, bright floor covering and comfortable leather seats. Finally, the biggest thing they did was to give the new car a clean-cut, low-hung, streamline, flowing effect with an artistic finish. They embodied the appeal of appearance on which the automobile manufacturer has concentrated so strongly for years—and the feature which has been his biggest selling asset.

Summarizing the situation, for some years past, our industry has had a hard struggle to preserve itself. And on the whole it has put up a good fight against heavy odds. But it has been largely a defensive fight. No matter how good a defensive fight we make, we can't win by simply defending our goal; we must adopt offensive tactics and score some points for our side. If we don't carry on the battle along these lines, that time may come when we'll fold up and disappear—like a folding bed slipping back into a dark closet after a hard night.

It is not a simple task to convince the public and its officials that we are on the right track. But just because we can't see our way clear to the ultimate goal will keep no one but a Kahunavik from starting out in the right direction.

The Car—Show Window of the Industry*

The Railway Should Make a Good Display of Its Goods if It Would Attract Customers—Selling Principles Are the Same as Those of Any Other Merchant, as Results on Many Successful Railways Running Attractive New Cars Have Proved

By **E. B. Meissner**

President St. Louis Car Company

E. B. MEISSNER

VIEWED solely from the standpoint of publicity, the displaying of merchandise has come to be recognized as the most valuable advertising, the greatest sales-producing medium, in the entire world of commerce. High salaried writers of advertising, who are artists in the handling of the printed word, may spend weeks upon the preparation of descriptive copy. The finest of printing may be used in publications, in which the page rate ranges into the thousands, but none of these descriptive phrases, none of these expensive layouts, has the sales power, the ability to open the purse of the prospect, that an actual display of the product itself possesses, providing, of course, the product or commodity for sale has quality and merit.

But just what is a good window display? Is it one that is so powerful in its attention-attracting qualities that it almost reaches out and stops those who pass? Is it one which attracts because of its beauty, its atmosphere or its scenic effects? The test of a window display is whether or not it sells. If it does, it is a good show window, regardless of whether it is artistic or crude, cheap or expensive, beautiful or otherwise.

Not long ago in the New York press mention was made of an incident relevant here with reference to a show window on lower Fifth Avenue in New York. The location was a very small shop, with an out-of-proportionately large show window in which the merchant displayed his wares in an attractive manner. The daily receipts in this small store averaged $125. By accident the plate glass in the window was broken, necessitating boarding it up for two days until a new piece of glass could be installed. During these two days in which this show window was boarded up awaiting replacement of the broken glass the receipts inside the store dropped to $20 per day, and to prove the theory of the power of show window display it is related that when the glass was replaced and the former show window display was again in sight the receipts inside this small store immediately climbed back to the normal $125 per day.

ALL SELLING BASED ON SAME PRINCIPLES

In the minds of some of you who are listening to or reading this paper there may come the query as to what all this has to do with the electric railway industry.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

Some might even say to themselves or others that this sounds like a department store staff meeting. But let me emphasize the fact that fundamentally the selling of merchandise, or service, or any other commodity must be accomplished in the same basic manner. To succeed you cannot wait for customers, or passengers, if you please, by reason of their own inertia to flow your way. You must sell your service to them by attracting their attention to it. In other words, you must display your service in a show case. By so doing, if what you have to offer has quality and merit, you attract attention, you arouse interest, you stimulate desire, and induce action in the form of creating business.

One of Shakespeare's characters in his play "As You Like It" says: "All the world's a stage, and all the men and women merely players." By that same token may I not say that your own city is your show window and the cars you operate are your display? Your show window, your city, is provided for you by others, and is being improved for you in most localities from time to time. Your display—your cars—are in attraction, design, safety, speed and comfort whatever you make them, which prompts the question whether you have kept your display in condition to attract trade. Fashions, if I may so term the style of cars, in electric railway equipment, as in clothes and other products, have changed. The up-to-date management keeps its cars in attractively painted condition—clean, light and airy, with safety appliances installed in them, with comfortable seats for passengers, and well maintained and quiet, thus merchandising their service, and by doing so increasing their net earnings and obtaining successful operation.

MODERN EQUIPMENT IS SELLING SERVICE

Brooklyn, Grand Rapids, Johnstown, Memphis, Chicago, Milwaukee, Illinois Traction, and others, were leaders in this program, with the result that by reason of their courage and foresight they have won the confidence and co-operation of their public and are now carrying many more passengers, naturally materially and favorably affecting their balance sheet. In some localities it is a well-known fact that by reason of "dressing up their show window"—modernizing and attractively finishing their cars—results which were discouragingly in the red were in a short time changed to black, due solely to this enterprising departure.

It has not been but in recent years that the electric street and interurban operator has been made to recognize that his business is fundamentally no different from any other commercial enterprise, and when he became aware of this condition he devised ways and means to stimulate his business. Those operators who were "on the job," so to speak, and took immediate action toward "dressing up their show window" promptly benefited thereby, and their leadership, experience and success should be a lesson to those who are more conservative and who have not yet experienced the improvement awaiting them by commercializing their business.

TODAY'S PUBLIC SHUNS DINGY SURROUNDINGS

Cobweb days are over. Not so long ago banks were proud of the old, dingy, antique appearance of their banking rooms, having in mind, perhaps, the fact that this age-worn condition would convey to their patrons their stability by reason of having been in business for so many years. Look around your town today. Are the quarters of any of your progressive banking institutions musty? No, indeed. They are massively built, attractively decorated, spotlessly clean, and some even have comfortable rest rooms equipped with upholstered furniture, telephone service and other items of comfort.

The condition referred to in the foregoing is not applicable alone to city lines. On the contrary, it has been and should be more so applied to interurban roads. Propaganda had it, not so far back, that it would not be long until electric interurbans would be on the shelf. Some conservatives in our industry were impressed by this evil pessimism, but others, more courageous and far-sighted, took action, and decided to match their ability and experience against that of those who were trying to becloud and shadow and wreck their life's work. So what did they do? These outstanding operators improved their service, added lighter and more comfortable, faster and attractively painted cars, shortened up headways, cleaned up their right-of-way, painted their poles, freshened up their waiting stations, schooled their employees in serving the public with courtesy and promptness; again to find that this policy won out. Not only did they remain in business, but, to the surprise of some, their earnings increased beyond their own expectations, after but a short time of this new operating era.

MODERN EQUIPMENT ESSENTIAL

To sum up and review the situation briefly, let me urge you to fall in line with progress. Authentic reports of the American Electric Railway Association tell us that there are many thousand cars in service which are not a credit to their operators, certainly not a credit to the industry, and naturally not an asset, but a liability. To those to whose property this condition applies, I would say resolve now to plan improvement in the form of dressing up your show window. If for financial reasons you cannot immediately add brand-new equipment, at least clean up and modernize to some degree your present loss-creating cars. Ask those operators who have experienced this success what they did and how they did it. You will find them anxious to help you achieve the same end. You will find also that the car builder is ready to serve in any capacity possible with minimum effort on your part to place you in position to own and operate new, up-to-date, profit-earning equipment.

Summarizing the situation, for some years past, our industry has had a hard struggle to preserve itself. And on the whole it has put up a good fight against heavy odds. But it has been largely a defensive fight. No matter how good a defensive fight we make, we can't win by simply defending our goal; we must adopt offensive tactics and score some points for our side.

—E. F. WICKWIRE

City and Company Co-operation Essential*

Experience in Chicago Shows that Much Can Be Gained by a Mutual Understanding of Traffic Control Problems—As the Benefits Accrue to All Concerned, Conflicts of Authority Will Only Retard Development

By **R. F. Kelker, Jr.**
Kelker, DeLeuw & Company, Consulting Engineers
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R. F. KELKER, JR.

CHICAGO'S traction history presents an unusual opportunity of observing the good and bad effects produced by changes in the character of co-operation between public officials, business interests and the management of its various transportation companies. A brief review of it demonstrates that intelligent and sympathetic co-operation is one of the most important factors affecting the public relations throughout a great industry.

In 1907, after a number of years of negotiation, twenty-year grants were made to the two major companies now comprising the Chicago Surface Lines. At the time of acceptance the condition of the tracks and paving in the greater part of the city was deplorable and the equipment was inadequate. The immediate effect of these ordinances was the completion of a vast program of reconstruction and extension, a period of six years during which sound co-operation was the keynote of public and corporate relations. Then followed a period after the unification ordinance of 1913 when co-operation disappeared. It is of interest to note that during this period of nearly ten years no interest, other than casual, was shown by the business men of Chicago. While the conflict was on it was practically impossible to bring about any major improvements in service or in traffic conditions. In a measure the company was entirely in a state of defense up to the last change in our city officials in April, 1923. The present Mayor, in the early part of his administration, announced his policy as being one of willingness to co-operate in order to provide the transportation and traffic improvements that the people who elected him desired, and he further stated that he expected to utilize every means in his power to that end. Steps were immediately taken by the Law Department of the city to clear up the pending litigation, which had given so much trouble and had proved so costly both to the city and the Chicago Surface Lines.

Near the close of 1923, at a conference between the Mayor and the management of the Chicago Surface Lines, it was decided to prepare plans for rerouting of street cars in the downtown district in order to relieve as far as possible the then intolerable traffic situation. After a number of conferences between the city's representatives and the company's officials a joint plan was finally adopted in 1924 which brought about marked improvement and is in effect today. In the joint plan the traffic problem was put on an equality with the transportation problem; there was complete co-operation between the city and the company, and this co-operation was so effective that the commission, upon the testimony of one witness (presented by the city), set aside its former order and adopted the new plan as recommended, without change.

The improvements in transportation and traffic conditions were apparent to even the most casual observer and the commission has not been called upon to make any changes that would impair the plan. The rerouting plan enabled the company to give more and better service without increasing operating costs, it benefited the car riders, motorists and pedestrians and its adoption was made possible only by co-operation on the part of all parties concerned.

In the latter part of 1923 the Chief of Police had seriously considered the prohibition of the left-hand turn for vehicles in the central business district, but found that such a regulation would be impracticable unless left-hand turns by street cars were also eliminated. The practical elimination of left-hand turns by street cars brought about by the rerouting plan paved the way for a police order which was immediately issued by the Chief of Police prohibiting any vehicle from making a left-hand turn at 30 street intersections in the area bounded by Wabash Avenue, Van Buren Street, Franklin Street and Lake Street. These two changes, the complete rerouting of street cars and the prohibition of left-hand turns by vehicles, immediately facilitated all traffic movements in the downtown area and the speed of street cars was increased more than 25 per cent. The benefits to all concerned were so marked that keen interest on the part of business men was awakened and since that time the Association of Commerce has joined in the co-operative work of the city and the company.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

In the latter part of 1924 the city took up for consideration the use of traffic signals in the central business district. The street traffic committee of the Association of Commerce became interested and volunteered to make an investigation as to the possible advantages and disadvantages of traffic signals. The studies, made with the co-operation of the Chicago Surface Lines, developed the need for a system of signals so controlled that a progressive movement of traffic throughout the area could be had. The City Council made a liberal appropriation for traffic signals. After a thorough investigation signals far more substantial than any theretofore manufactured were designed. There was a complete agreement on the necessity of obtaining a control of the most flexible character in order to meet the varying requirements at each intersection. Therefore, a switchboard was designed to permit of a variation in the amount of time given to the red and green portions of the signal cycle at one intersection independent of such time given at any other intersection. The signals were placed in operation in February, 1926. Since then there has been a material increase in the speed of all street traffic, and this in turn has been reflected in an increase in the carrying capacity of the streets themselves.*

These improvements in traffic conditions in the downtown district during the past two years, notwithstanding the substantial increase in the number of motor vehicles registered, is a remarkable achievement made possible through the complete co-operation of the city administration, the business interests and the management of the Chicago Surface Lines. As a single illustration of the improved service the street railway company was enabled to give, it can be stated that the running time of cars passing through the business district on the heaviest traffic artery, State Street, was cut in two. The same spirit of co-operation has been applied with success toward the establishment of loading zones and the retention of the skip-stop plan of operation throughout the city.

The latest effort in co-operative work is the city-wide traffic survey now being conducted by the street traffic committee of the Association of Commerce. The committee, believing that much good could be accomplished by a broad survey and the making of a uniform traffic code, requested the city to undertake the work. It was found that the city was unable to finance the proposed program, and in response to a request of the Mayor the Association of Commerce offered to defray the entire cost. This work is now nearly completed under the direction of an enlarged committee, on which both the city and the Chicago Surface Lines are well represented.

The accomplishments which I have taken your time to outline were made possible by a complete change from the policy of warfare that had existed for so many years, during which no one was benefited. Similar results can be achieved in any city where a real and sincere desire to serve the public is a dominant and governing factor in the policy of public officials, business men and the management of the transportation lines.

The difficulty of obtaining co-operation between public and operating officials is due largely to the failure of one group to understand the limitations and responsibilities of the other. The furnishing of transportation service is an art. Transportation itself is but a tool with which the management endeavors to provide a convenient and satisfactory service. Necessarily the street railway management is busily engaged in routine operating matters, and consequently its perspective in the matter of improving service may be more or less limited. Therefore the investigations and recommendations on the part of the city officials should prove helpful, although not always practicable. On the other hand, it is rare that managers realize the plight of the public official who is continually besieged with requests for service improvements. The management must always consider the financial inhibitions to service improvement. The public official, as a general rule, considers only the needs of the public and not the financial limitations. As a result these two interests frequently clash.

If management can be made to understand the relations of public officials to their constituents and if public officials and business men will consider the financial responsibility and technical operating problems that surround the management of transportation lines, then these several interests can co-operate fully, with the result that the people served by the management, and the city as a whole, will receive the maximum benefit based upon the combined thought of the three groups, which unfortunately do not work in accord in a great many instances. The whole matter can be expressed in the single word "service." When the management gives the best service it possibly can and when public officials and business men endeavor to aid good management in providing that service, then we have a state of complete co-operation where the good of all is considered and where satisfactory service is rendered to the public.

Let me recall to you in closing the remark of the late Charles P. Steinmetz on this subject: "Co-operation is not a sentiment; it is an economic necessity."

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*See ELECTRIC RAILWAY JOURNAL for March 27, 1926, page 536.

If management can be made to understand the relations of public officials to their constituents and if public officials and business men will consider the financial responsibility and technical operating problems that surround the management of transportation lines, then these several interests can co-operate fully. . . . The whole matter can be expressed in the single word "service." When the management gives the best service it possibly can and when public officials and business men endeavor to aid good management in providing that service, then we have a state of complete co-operation where the good of all is considered and where satisfactory service is rendered to the public.

—MAJOR R. F. KELKER, JR.

We Are in the Transportation Business*

Loss of the Railway Investment Would Be a Mere Bagatelle Compared with Loss to the Community if Service Fails—The Public Can Be Made to Understand the Need for Proper Treatment of the Utility that Furnishes It

By **Henry L. Doherty**
President Henry L. Doherty & Company, New York

H. L. DOHERTY

I AM more and more of an optimist on the street railway situation; not, however, on the statistics that have been shown and some of the facts that have caused some of the other people to be optimistic, but on the conditions that exist and what we ourselves should be able to accomplish. It is perfectly idle for us to be the only ones, when it is necessary, to be compelled to walk the floor as to the matter of the transportation problem.

No matter if we in some cases were to lose our entire investment, that would be a small matter compared with what the loss would be to the community as a whole where a thing of that sort occurs. I have tried to make that thing clear for a number of years. Perhaps I haven't been as industrious about it as I should have been; but I do know that it is possible—and I think a great many other people share the belief with me now—to make the public understand that it is their problem and it is perfectly idle for them to stand back and simply assume that we have that whole problem to wrestle with. You may say, "he is just talking stuff and we have heard him talk that way for a long time," but nevertheless it is talk that nobody has attempted to contradict. Even the enemies of the street railway situation have not attempted to contradict it, and just as long as no other fellow contradicts it I am going to keep on talking this way. I hold that every city must have a common transportation system. Without that, it means such an enormous loss and such an enormous retardation of the development and welfare of that city that any injury we suffer is nothing compared with the injury that is suffered by the city.

If the city is going to have its common transportation system, that system must be self-supporting, it must have credit, and it must have not a mere passing credit that just enables it to skin through, as it were. It must have a credit sufficient not only to meet the growth of that city but to anticipate and help with the growth of that city.

If anybody tries to answer you by saying, "We haven't had satisfactory transportation conditions in this city for a good many years, but we have continued to grow," you can say, "All right, if you are satisfied with that kind of an argument. We can point to places where they happened to discover oil and without any facilities they created a town over night. What they did was done in spite of conditions they had to meet, and no sane man can maintain that the greatest results in any city can possibly take place unless you have a proper and adequate common transportation system." I don't think any man can successfully combat that argument.

The value of the railroad property can be taken and spread over your entire city. You can show that the inevitable decrease in property is bound to be due to the growth of the population and you can show that your railroad values, which in some cases have been threatened with destruction, are a mere bagatelle in comparison with what the other people are bound to lose, provided that transportation is being offered to the public at a proper rate.

Transportation is not at all the matter of money we get as interest or dividends. Given a proper density of riding, and not a condition that is merely temporary and cannot long prevail, the entire interest and dividends that the street railway company has to collect would not be more than three-quarters of a cent on every paid passenger. Three-quarters of a cent is not the problem in giving transportation at a cost that is satisfactory. They would never notice the difference.

Just the lack of giving the transportation system a proper amount of return to maintain its credit has meant the difference between a satisfactory condition beneficial to everybody and a chaotic condition unfavorable to the company—hard on it and unfavorable to the city as a whole.

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*Abstract of a discussion at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

I agree fully with the last speaker, Mr. Swayne, in some of the things he said. I think one of the biggest mistakes we men who were originally in the street railway business made was this—and it has been true of other branches of public service and will be true of other branches of public service: Just so long as any of us remain in public service we must remember that in every case we are giving a service. We mustn't assume, which is the mistake some of us made, that we are in the street railway business. We never were. We were in the business of transporting passengers. The public wants transportation—not necessarily street railways, not necessarily street cars. Whenever we are serving the public we must remember that many of the things we think of as being our business are simply our tools, and if better tools come it is up to us to use them and not let other people make competitive things out of these tools we should be the first to adopt and we should have the greatest facility to put into the public use.

I am trying, and there are other men doing the same thing, to make every man in the street railway business, and especially those who have the ability to get the matter before the people, to write and secure the reading of what they do write to carry the thought to the whole of the American people; that they are the ones who are primarily interested in seeing that there is a proper common transportation system in every one of their cities; that they are the ones who will suffer if they don't have it, and that the worst kind of a short-sighted policy would be to support anybody who puts an obstacle in the way of creating such a proper transportation system, and that they not only must not support those who oppose it but they must support those who are trying to give it. And they must even go further than that. If nobody is ready and willing and trying to give it to the public, they must go out and create conditions so that they will get it, because it is something they have to have.

Congested Streets Are Costly

By Clarence O. Sherrill

City Manager, Cincinnati, Ohio

VERY real is the revolution in our methods of living caused by the advent of the motor car. It is hardly equaled by the changes caused by some of the world's great upheavals. Out of this motor car revolution have grown a host of problems not yet solved. One of the most serious of these is the problem of the congestion of streets by traffic. Because this development has been so tremendously rapid, the physical means necessary to take care of it have not kept pace with the motor vehicle.

C. O. SHERRILL

Rapid means of transportation have immeasurably increased the joys of life by allowing people more and more to live in the open spaces far from the congested business centers where daily they go to work. It allows the farmers' families to visit neighbors many miles away, and the changes of scene it allows do more to broaden men's minds than any other one feature of modern life. But the motor car has not been an unmixed blessing by any means. I sometimes even feel that it is questionable if the sum total of human happiness is not less rather than greater as a result of the hurry and rush of the motor car and the evils it has brought with it.

The point has now arrived when the traffic problem must be recognized as second to none in the realm of city administration. It will tax the skill of the best minds of our traffic engineers to solve this problem. The very first step is to have complete information on vehicular and pedestrian traffic movement, density and character. The problem cannot be considered as solved by making so many restrictions as to force pedestrians or essential vehicles to stay out of business areas. There are many advantages in having ready access to the heart of the city for all vehicles, but the really important, vital thing is to get the mass of workers and shoppers to the stores, factories and offices in the shortest possible time, for every minute of wasted time is an increased cost to each individual.

This indicates the necessity of giving precedence to vehicles in the streets in the order of their capacity for moving the greatest number of riders in the least possible time and using the least possible space in doing so. This order is: First, street cars; second, motor buses; third, taxicabs; fourth, private motor cars. Of course, the proper place must be assigned in this priority to trucks making essential deliveries in the business districts.

All forms of vehicular traffic are useful only for the purpose of getting the riders to a point sufficiently near their destination to allow them quickly to arrive on foot along the sidewalks. It will therefore be evident that the order of restrictions to be placed on the movement of vehicles in the streets is the reverse of the above, namely: First, private motor cars; second, taxicabs; third, buses; fourth, street cars. Everything possible must be done to facilitate the movement of street cars and buses on account of the large numbers of riders they carry to the shopping districts, with a minimum of space occupied per passenger. A recent check of vehicular traffic on one of the principal thoroughfares of New York indicates that the average private automobile or taxicab carries 1.7 persons, exclusive of chauffeur. The roadway space occupied by an automobile is about 100 sq.ft., so that each passenger takes up approximately 50 sq.ft. of the city street. A street car of average size occupies approximately 320 sq.ft., seating 40 passengers and carrying more than 80 when filled. The space required, therefore, for each passenger seated is about 8 sq.ft., or, when the car is filled, about 4 sq.ft. The roadway space required for each person transported by private motor car is therefore from six to twelve times as much as is required to carry him by street car.

PRIVATE CAR WASTEFUL OF STREET SPACE

This is not all of the story, however, for not only does the private motor car occupy roadway space while it is carrying passengers into and out of the congested area, but also when it is parked without passengers for a longer or shorter period of time while its owner is in his office, theater, store or restaurant.

This points to the crux of the traffic situation, the parking evil. On every street where traffic is dense lines of parked cars can be seen along each curb. The available space for traffic on these streets is therefore reduced by two full traffic lanes, which is usually from one-third to one-half of the street's capacity. From the above, it appears obvious that there is only one real and absolute solution of the problem of traffic congestion, and that is the enforcement of necessary laws forbidding the parking of private motor cars in congested areas. This would at once make all streets fully effective, except where interference would occur due to loading and unloading of trucks, which could be so regulated as to have this work done during the hours when traffic is not dense. Not only would this law automatically release two full lanes of traffic in each street, but indirectly it would be of equally great importance in discouraging the movement into the restricted areas of large numbers of motor cars now driven in and parked there unnecessarily. In some cases during periods of greatest density of traffic it may even be necessary to forbid stopping of cars as well as parking, because a car stopped momentarily at intervals along each square destroys the lane of traffic adjacent to the curb. A motorist seeing ahead of him a motor car stopped will not risk being caught behind it, so he at once works over into the second lane. (Note:—The term "parking" in this paper means to stop longer than necessary to load or unload passengers or freight.)

PARKING SERVES FEW AT EXPENSE OF MANY

When we consider the exceedingly small number of cars that can be parked in the congested area of any city, it will be apparent that certain motor car owners are a specially privileged class to be allowed to occupy so large a percentage of the street area with such a very small percentage of the motor cars. In Cincinnati the congested district has been estimated to provide parking space at the curbs for approximately 3,000 motor cars. There are registered in the city approximately 100,000 motor cars, and in the metropolitan area directly tributary not less than 150,000. Parking privilege, therefore, is granted to from 2 to 3 per cent of the car owners at the expense of the rest of the 97 or 98 per cent, or some 5,000 persons are given this privilege at the expense of some 400,000 residents who suffer from traffic congestion.

All studies by traffic experts now point to the same conclusion; that is, that the only solution of the problem of traffic congestion is the complete prohibition of parking within the congested district. In June of this year Chicago, on the occasion of the Eucharistic Congress, found it necessary to forbid all parking in the congested areas of the city. With this regulation it was found possible to handle without difficulty the tremendous crowds attending that event.

In connection with the survey of Chicago traffic conditions it was found that only about 8 per cent of the shoppers going to the downtown district use their own motor cars. A similar survey in Cleveland recently showed that 65 per cent of the shoppers travel on street cars, about 10 per cent on motor buses, 20 per cent in private motor cars and 5 per cent on foot. Two years ago a similar survey showed that 46 per cent came in motor cars, as compared with 20 per cent at the present time.

STREETS FOR MOVING TRAFFIC—NOT STORAGE

The streets are intended for and must be used more fully than ever before for traffic, reasonably rapid traffic, but, above everything, safe traffic, and this means that as traffic demands grow more acute the use of streets for other purposes must be more and more restricted. The first step in this direction is the elimination of interference with the free movement of vehicular traffic by various obstructions, of which parked cars are the principal offenders. Land in the heart of large American cities ranges from $10 to $100 per square foot. At a low average of, say, $30 per square foot a parked car takes up about $3,000 worth of space. In other words, each of the thousands of parked cars that you see in the congested area of Cleveland is costing the citizens as a whole, say, $150 a year to give a few hundred citizens preferential treatment, as against the 700,000 or 800,000 residents who are deprived of the proper use of this space for traffic purposes.

Retail merchants and other commercial interests were formerly a unit in opposition to restricted parking, but they are now fortunately beginning to realize that this parking benefits such a small number of individual shoppers as to be negligible in furnishing business to the stores. I feel sure that the time is approaching when parking will be entirely eliminated from the congested area of our principal cities on request of the retail merchants themselves. Owners of cars will leave them at home and ride in street cars and buses or will drive their cars to a convenient parking place outside of the congested district and from there walk, take a taxi, bus or street car to their places of business. I even feel that I can go further yet and see in the not far distant future a time when no cars driven by owners will be allowed to stop in the congested area, all streets then being devoted solely to street cars, buses, taxicabs (under strict restrictions) and pedestrians.

I can also see the time not far distant when taxis will be forbidden to park in the streets in the congested areas and will be required to operate exclusively from garages on call, having telephone stations on the sidewalk from which they can be reached on a moment's notice. The evil of taxi cruising has become so serious in every large city as to justify the use of the most stringent means to break up this practice. The only justification for special privilege for any kinds of vehicles is on the ground of public welfare and necessity; that is, the greatest good to the greatest number, and this principle applies alike to all the various classes, namely, buses, street cars, taxis and private motor cars.

There is another essential use of the streets that must be controlled as to time and method, and that is the loading and unloading of freight from trucks. In the absence of adequate alleys for back-door loading, this must obviously be done in runways off the street or from the street proper, but must be ultimately so arranged in time and method as not to interfere with the free movement of traffic during busy hours. Trucks must be provided with means for side loading and most of their work will have to be done before 8 a.m. and after 6 p.m.

There are a host of constructive measures that are being tried out in all cities in the attempt to solve traffic congestion, such as the widening of streets, the cutting of new streets through beautiful forest and park areas or expensively developed building areas, bridging over intersections to give two levels of roadway. These measures, no matter how heroic, do not solve the problem, for they do not attack the real cause of traffic congestion, which, as said above, is the private motor car—riding habit. On account of the dammed up, unaccommodated mass of vehicular traffic only waiting for street space in which to pour, the very moment a new boulevard is opened up for relief, it is at once jammed with a flow of traffic that, like a raging torrent, bank full, races along its way. An authority on New York traffic says: "No one who has devoted any study to the traffic situation can doubt that within 30 days after opening a new thoroughfare parallel to Fifth Avenue the congestion would be as great as it is today."

MERCHANTS NEED INFORMATION

The Department of Commerce has made an extensive survey of "Vehicular Traffic Congestion and Retail Business," in the course of which more than 1,500 opinions were secured from retail merchants as to the nature and extent of interference due to traffic congestion. There was no disagreement as to real interference and real congestion, but one might say there were as many methods of relief proposed as the number of opinions given on the best way to get rid of the hindrance.

The survey of this study gives the following four principal causes of the traffic problem in the order named: Faulty traffic regulations, lack of parking facilities, narrow streets and the street cars. The above-mentioned study was based entirely on the views of a single class, namely, retail merchants, as would be indicated by the four causes of interference which are named above.

As an illustration of this limited viewpoint, three of the larger retail merchants in Cincinnati recently made a proposal that "no parking" be eliminated and one-hour parking be allowed in the vicinity of their stores, but insisted strenuously that the curbs immediately in front of their doors be kept open at all times for the convenience of their shoppers. It was then pointed out to them that if this same rule were applied to all merchants alike, space being taken out in front of the doors at the entrance of each establishment, also for fire plugs, taxicab stands, bus stops, etc., there would be practically no space left for parking of cars at all. This phase of the question evidently had not occurred to them before, for there has been no further complaint on their part on account of elimination of parking in the vicinity of their stores.

STREET CARS USE STREET SPACE EFFICIENTLY

In reference to congestion caused by street cars, it is true that street cars are a great obstruction to the free movement of traffic as compared with motor cars, but when the number of passengers carried per square foot of space is considered, the street car can hardly be considered as a serious offender.

There are many elements that go to make up the objectionable features caused by traffic congestion. Among them are the danger or hazard element to motorists and pedestrians, the loss of time in riding, the inconvenience to which the individual shopper is subjected, the anxiety caused by the delays and crowded conditions. These inconveniences result in diverting business, loss of business, increased cost of merchandise and oftentimes even a diversion of large numbers of shoppers to local neighborhood shopping areas.

Public service can be rendered by your association in helping to solve this problem and in educating the public as to the evils of unrestricted parking and the benefits of "no parking" in congested areas.

OUR most difficult problem, in this age of automobiles, is the selling of our service to the people who need it, to the communities in which we operate. By this I mean getting the people to ride and the authorities to understand that a transportation company cannot succeed unless it earns a reasonable return on the value of the property used and useful in the business, after paying operating expenses, taxes and the setting aside of rainy day reserves. Few electric railway companies are now doing such things, yet the country is growing and is more prosperous than ever in its history. Such a condition is paradoxical and it does not seem as if it could continue.

—B. C. COBB.

Intercity Business Possibilities*

Freight Service Can Be Developed by Many Electric Railways to Produce a Profit—Correct Equipment and Facilities Are Needed if Best Results Are to Be Secured—Passenger Business Also Can Be Increased

By **T. A. Kenney**
Vice-President Hodenpyl, Hardy & Company, New York City

T. A. KENNEY

I DON'T quite understand what was meant by the title of this address, "Intercity Business Possibilities," but I would like to say a few words about the interurban transportation business as conducted by electric railway companies. Obviously my remarks will have to do with profitable operation of such systems. My remarks also presuppose that there is an economic necessity or justification for the interurban transportation business.

Originally electric railroads, and that constituted the transportation systems of the electric companies, were constructed for the carrying of passengers alone. Later on, with changing economic conditions brought about by more general use of the automobile, these railway companies cast about to find ways and means to take up the slack in the local transportation business. First of all—and I am speaking now with reference to conditions in the vicinity of Cleveland—efforts were made to engage in the electric express business. Business of that character has been carried on for a great many years by several of the electric railway companies whose roads come into the city of Cleveland.

You can readily imagine that the competition in the electric express business is very keen. Following those efforts, which were more or less successful, several of the companies started in the freight business and that has been rapidly extended so that today a very large, and I say without hesitation, profitable freight business is now being conducted by not only the electric railroads that center in Cleveland but the connecting electric railroads that extend into the states of Michigan, Indiana and Kentucky.

FREIGHT PRESENTS NEW PROBLEMS

Starting in this new form of transportation business many problems were presented. At first some of the companies were unwilling to speculate by investing large sums of money in new equipment. Old passenger cars were remodeled for freight service. Existing buildings not designed for handling freight were made use of. Later on, as the business grew, new equipment was purchased. Here quite a problem was presented as to the type and size of car—a car that would fit all of the conditions with respect to the business offered in the several states I have just listed.

Fortunately the Central Electric Railway Association has among its members a number of very progressive managers. Some one conceived the idea of standardizing a freight car that could be used on the electric lines and that might be accepted and exchanged by some of the steam railroads. Such a car has been designed and placed in use.

These electric railroads are prepared to accept and are accepting freight of all kinds. One of the latest developments, engaged in by one or two companies, is the matter of handling cold storage materials. This required the designing and building of a refrigerating car. It was not an easy financing problem for many of these electric railway companies to purchase new equipment. It is only fair to say that the car manufacturers have rendered a great service by offering very favorable terms as to payment.

Purchase of the freight cars did not in itself build up the freight business. In order to accomplish that it was necessary to establish freight soliciting departments so that cars could be loaded to and from destination. Much success has been accomplished by the establishment of those soliciting departments.

Five years ago the gross earnings of the freight departments of the various electric railroads in the vicinity of Cleveland did not exceed $100,000, and for the year 1926 the gross earnings of those same roads from this freight business will aggregate something approximating $3,000,000. I mention those figures only for the purpose of showing that there is a real demand for the freight service that can be given by electric railroads. There are instances where, between large cities in the vicinity of Cleveland and other cities in Michigan and Indiana, ten and fifteen days are required for the delivery of an ordinary freight car on the steam roads. In both cases to which I refer delivery can be made by electric railroads within 48 hours.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

These same electric railroads, in addition to engaging in the freight business, have also had recourse to new ways and means of building up their passenger transportation business. To that end, although it may appear as being in direct competition with their own railroads, buses of modern type have been made use of.

The electric freight business will shortly be extended from Cleveland so that freight can be accepted and delivered in the region as far west as Chicago and other points in Illinois and somewhat later as far east as Albany, N. Y. What the possibilities for the future are when those connections are made, you can speculate as well as I.

Local Transportation Demands Have Changed*

Convenience of Personal Car Has Modified Desires of the People with Respect to Public Services—Electric Railways Still Render the Best Mass Transportation, but People Living Away from the Car Lines Want Service Brought Closer to Their Doors

By **Alfred H. Swayne**
Vice-President General Motors Corporation

WILL the motor bus replace the trolley car? That is the question most of us constantly either hear asked or discuss among ourselves. Pages and pages of news items quoting from the remarks of those engaged in operating both forms of passenger transportation, ranging from traffic and transportation experts to college professors and others, have been written on this subject. Newspaper editorials on the subject are almost as frequent as those on prohibition, but to many the question still remains unanswered.

Without attempting to give you the final answer, I would call your attention to certain things that appear to be important as indication of both what is happening in the local transportation field, and what we may expect from the natural progress of evolution.

A. H. SWAYNE

In 1662 there were only six stage coaches in all England. In 1798 the mail left London for Shrewsbury —162 miles—and took 27 hours for the run. Then the railways came. The first was opened to the public in 1830 between Liverpool and Manchester. Of the 30 coaches that had plied between the two towns all save a single one went off the road soon afterward. And now the motor bus—a highway vehicle—is in competition with the railway that 100 years ago eliminated highway transportation by coach. Evolution again wins out, but evolution is no respecter of persons, opinions or facilities.

Now let us review some of the significant facts. An editorial in the New York *Evening Post* of Aug. 27, entitled, "Buses and Trolleys as Transit Rivals," stated in part:

> In the rosy imagination of certain observers the bus is on the point of pushing the surface rail car off the map. Impressed by the rapid invasion of the bus, both local and intercity, they see it sweeping its way to early and complete triumph. Such a vision, however, is possible only by overlooking a few stubborn facts. In the forefront of these facts is the rather significant detail that more than 1,000,000,000 passengers were carried by the trolley or other surface rail lines in this city [New York] last year. What this means can be appreciated when it is added that these 1,000,000,000 passengers were almost two-thirds of the entire number of passengers carried by all the rapid transit lines. Two persons in every three who made use of our rapid transit

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

facilities took a trolley. Talk of scrapping so immense a public carrier overnight is obviously inane. The trolley may be doomed, but it is going to follow the example of Charles II and be an unconscionable time dying. The step for the immediate future is not the wholesale substitution of buses for trolleys but co-ordination of the two kinds of transportation.

Regarding the ability of motor buses to handle mass transportation, a few pertinent facts that must be considered as conclusive evidence on the subject are that:

In 1924 all tramways in Metropolitan London carried 968,000,000 passengers as compared to 1,484,000,000 carried by motor buses; in 1925 the tramways carried 978,000,000 and the buses 1,671,000,000, or an increase of 12.6 per cent, whereas the tramways increased only 1.1 per cent, a clear indication that over there the people like bus transportation. A still greater increase in bus transportation is shown by a study of the passenger travel statistics covering the period 1913 to 1925, when the total volume of traffic increased 63 per cent. Comparing tramway and bus for this period, it shows that tramway passengers increased only 21 per cent as compared to 127 per cent for the motor bus. At the Wembley Exposition the London General Omnibus Company on Whitmonday, 1924, moved 178 buses per hour in and out of the Forecourt Station, hauling 143,000 riders between early morning and midnight.

The lesson I learn from studying these figures is, first, that the motor bus is capable of moving masses of people, and secondly, that we cannot afford to ignore what others are accomplishing with the same tools we must use in solving problems in transportation that basically are quite alike. Circumstances alter cases, and each must be studied by itself, *but* in the light of experience and with the determination to use each facility, electric car and motor bus to the extreme limits of their respective inherent possibilities, not simply to the extent we wish to use them. The final answer is not yet known to anyone. We may all have decided opinions, but thus far haven't the experience to prove if we are correct. The answer is neither all black nor all white, it is shades of color and the wise man will view it so.

That your members are making a concerted effort to apply the bus to their transportation requirements is easily proved by the facts at hand. Three hundred electric railways now operate more than 6,000 motor buses over 12,000 miles of routes. Akron—the old chestnut where buses failed, etc.—now has express buses operated by the local railway. It is reported that out of $300,000,000 being spent this year by the electric railways of the country, $23,000,000 is for motor bus equipment and facilities.

The convenience of personal transportation has changed the desires of the people with respect to public transportation. Local transportation demands have changed; as we expect to get hot and cold water when we turn the respective taps in our bathrooms, so the riding public expect to find transportation facilities "on tap" when they happen to want to ride.

Generally speaking, electric railways still render the best service in mass transportation, but people living off the car lines want service brought closer to their doors than it is possible for rail lines to give. Others prefer to ride on rubber, and are willing to pay for it. The wise local transportation man will carefully survey his field and give the people the service they want. Of course, he will not attempt to satisfy whims and give a service which will not pay a fair profit.

I believe that local transportation will soon settle down on a basis of fair earnings for good service. Electric railway companies that are directed by men with vision and courage will probably control the transportation facilities, rail and bus, of their respective communities. If they won't see the light, and continue to view motor bus transportation as a passing fancy, then the business will be divided among them and others who are willing to give the service the people demand.

Not only must the transit facilities meet a necessity, they must fill a convenience in every sense of the word. This is 1926, not 1900. As a people we are more exacting, and I believe we are willing to pay the price for this kind of transportation when assured of value received.

Here I would call attention to the fact that the electric railways are frequently not only concerned with the transportation of passengers by motor bus, but have also found a place for the motor truck in the transportation of freight. An excellent example of where this is being done in a scientific manner—a truly co-ordinated rail and road transport service—is from Boston to Worcester and Springfield. Containers loaded with freight at the merchant's door are moved by motor truck and electric railway flat car to the door of the consignee. The advantages to all concerned of this class of service are very apparent. Where electric railways handle freight the motor truck can in many instances be used to great advantage and, therefore, its usefulness should be studied.

Your association has laid down certain principles regarding the motor bus and, generally speaking, they appear to be sound. Automotive men with whom I am associated believe that a proper and scientific co-ordination of electric railway and motor bus is the only solution for our local transportation problems. This new transportation tool, the bus, must be used wherever it can be done to advantage and without prejudice. Fighting the march of progress, gentlemen; trying to throttle bus transportation through drastic regulation or other means is useless, and I believe already relegated to the Dark Ages, and I think you believe so too. Both the electric railway and automotive industries now have men in command who have already shown a broad spirit of co-operation in working together for the solution of problems common to both sides. Let us continue to follow this policy, remembering that we can have vision without being visionary and that the public must be served with transportation "on tap" and that a co-ordinated rail and bus service is essential to accomplish the desired result.

LOCAL transportation will soon settle down on a basis of fair earnings for good service. Electric railway companies that are directed by men with vision and courage will probably control the transportation facilities, rail and bus, of their respective communities.

—A. H. SWAYNE.

Providing for Future Transportation*

Intelligent City and Suburban Planning Includes a System of Thoroughfares—Super-Highways as Used in Detroit and Surrounding Territories Are Discussed—The Speaker Believes Every Town and Village Should Provide for Future Traffic Growth

By **Col. Sidney D. Waldon**
President Rapid Transit Commission, Detroit, Mich.

COL. S. D. WALDON

ULTIMATE capacity of any route depends on the width of right-of-way; that is to say, on the distance from the building line on one side to that on the other. This right-of-way width is what determines how much space can be devoted to roadway and sidewalks as well as what is available for rapid transit use. The greater the width of right-of-way the greater is the potential capacity of the route for surface and rapid transit traffic and the greater is the possible development of the territory traversed and served.

Originally regarded as an expensive luxury, the automobile has increased the owner's ability to earn and that of his family to enjoy life. It was inevitable, consequently, that once sensing these advantages, civilization would never relinquish the motor vehicle, but would rush overwhelmingly toward its universal adoption. In 1913, approximately 1,250,000 automobiles were registered in the United States. This number was increased seventeen times in the succeeding thirteen years and, as was to be expected, the increase has been going on at an accelerating rate.

The increase in the number of automobiles has been so great that it is useless to talk about shaving sidewalks for a few blocks to help the parking situation, when provision for one year's increase in Wayne County, Mich., which includes the city of Detroit, would require both sides of an 86-mile street. The parking problem is the business of the individual and not of the municipality, whereas the right-of-way space required for moving traffic at all times is one of the most vitally important concerns of the governing body. Great improvements can be made at relatively low costs in the open country, but the cost of the necessary measures for relief in the thickly built-up sections may be enormous.

A pedestrian takes up about 10 sq.ft. A moving automobile with a safe margin all around occupies 270 sq.ft. Assuming an average of two persons per vehicle, then each pedestrian requiring 10 sq.ft. on the sidewalk will as a motorist require 135 sq.ft. in the traffic space. Assuming that nothing but private passenger automobiles are to be used and that the full capacity of two 15-ft. sidewalks is to be balanced by a roadway of equal automobile capacity of two persons per car, there will be needed central traffic space of 198 ft. Adding two 8-ft. parking strips and the two 15-ft. sidewalks would make a total right-of-way of 244 ft. On the other hand, passengers in bus, street car and rapid transit train occupy only 5 to 10 sq.ft. —reasonably comparable with the space requirements of the pedestrian. While the pedestrian and the street car passenger occupy about the same square footage of street area as formerly, the average motorist requires approximately 13½ times as much space as either. If, in providing for future transportation, the automobile is to be regarded as a permanent factor, then the old standards of street and highway width are obsolete and new ones must be adopted.

CAR SPEED VERSUS ROADWAY CAPACITY

It is a serious fact and one not generally understood that the speed at which the greatest number of motor vehicles can pass a given point in a single lane is 15 to 20 m.p.h. The reason for this is that at each increase in vehicle speed there must be an increase in the face distance between vehicles. For a speed of 20 m.p.h. approximately 2,000 vehicles can pass per hour. This rated capacity is approximated every day when conditions are favorable upon the Detroit Grand Boulevard, but not for very long at a time, because one or another of the intersections is soon closed to boulevard travel to permit intersecting vehicles to have the right of way.

If two streets of equal width cross and each has equal traffic then the capacity of each is reduced at least 50 per cent, because neither can occupy the crossing more than half of the time. The intersecting street or highway is the most frequently recurring handicap to the efficient movement of motor vehicles. This is because the cars approaching an intersection with the signal set against them will close up the gaps which are necessary while they are running. When the red signal changes to green, the vehicles begin to move and the operation is reversed. The last car in the line can do nothing until every vehicle in front has got under way in turn. This still further reduces the traffic efficiency of the intersections. If the number of lanes is multiplied by say three, the same number of vehicles will cross the intersections in one-third of the time.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

Traffic figures show that the capacity of a single lane of traffic on lower Woodward Avenue, Detroit, which is controlled by traffic towers, averages less than 500 per hour. On Fifth Avenue in New York it rarely reaches, even for a few minutes, the rate of 600 vehicles per hour. This is less than one-third of the capacity of the same lane of vehicles if allowed to move continuously at 15 or 20 m.p.h.

GRADE SEPARATIONS EXPENSIVE

Grade separations for surface traffic purposes are extremely expensive and should not be undertaken without the most careful consideration of all of the factors involved. It is a grave question whether the demand for such expensive improvements does not indicate the need of an entirely new mode of transportation; that is, electric trains operating upon exclusive right-of-way. Except in very special cases, it would be foolish to embark upon piecemeal grade separations for surface traffic only, because most projects of this kind would simply result in moving the bottle neck to a new location a short distance away.

If, as a nation, we want to make the maximum use of the advantages offered by the automobile for individual rubber-tired rapid transit, then we must establish new standards of street and highway widths more generous than those that have been sufficient in the past. If, in the earlier development of our future cities, we provide the wide rights-of-way necessary adequately to take care of individual transportation by motor car, then we will, by so doing, be laying a proper foundation for meeting the needs of mass collective transportation later on.

The effect of increased accessibility resulting from any form of collective transportation is to stimulate development along the route and throughout the area served. Population is attracted because of the special service given. This in turn demands more service and so on, until the limit in capacity is reached of the particular form of transportation that is used.

When a beginning is made in rapid transit operation, the cycle of stimulated development begins anew, but with an added impetus given by street car and motor bus if used as feeders to the rapid transit line. Gradually the territory is built up to a new and higher standard of use, the two-track system becomes filled to capacity and there are also demands to lengthen the line into new territory. It is then economically possible, if the right-of-way is sufficient, to give a new and most valuable addition to the service by adding two more tracks. This will permit the running of express trains with limited stops so as greatly to increase the speed and consequently the area that can be reached within the same travel time of say 45 minutes.

Underground rapid transit is preferred by adjacent property owners to elevated forms because it does not interfere with light, air or surface traffic, and consequently, gives all the advantages of increased accessibility while retaining the full use of the pavement in the street that is occupied. Elevated or surface rapid transit are preferred by the riders because they are out in the open. In undeveloped territory, it is far cheaper to lay the rapid transit rails on the ground and to provide the necessary separations at logical station points than to build any form of elevated structure. For these reasons, the Detroit Rapid Transit Commission adopted underground rapid transit within the thickly built-up area and surface rapid transit upon super-highway rights-of-way for the suburban districts. It was also established as a principle that no two-track lines should be built without making provision at the time of construction for the increase in right-of-way necessary later to add the two additional tracks for express purposes.

Four tracks, together with main sewers and other sub-surface utilities, can be housed comfortably beneath a street measuring 120 ft. from building to building without disturbing the foundations on either side. This width may be considered as a basic measurement in plans for the major thoroughfares of a great city. If we let our minds run ahead to the further development of 50 to 100 years, 120 ft. becomes little enough.

MASTER PLANS PROVIDE FOR GROWTH

In the last 25 years Detroit has added 110 square miles of new territory and a population of 957,000. Facilities that will cost millions in future street openings and widenings would be in existence today at no expense to the city simply through the existence of such a plan. That cannot now be helped but it is never too late to make a beginning.

Detroit believes that it is destined to become one of the world's great cities. It believes that one of the ways to make this possible is to lay plans now while so much of the area of the future city is undeveloped and consequently in a plastic state so as to insure the automatic creation of wide rights-of-way at properly spaced intervals to serve all sections equally. This has resulted in the creation and adoption of what we call the "Master Plan." The principle underlying the master plan is that it is better to select a limited number of routes properly spaced with respect to each other, and to make these adequate to carry the individual and mass transportation of the district traversed with speed and safety, than to make every street of equal capacity.

The master plan provides a checkerboard of north and south and east and west arteries at approximately mile intervals and includes three existing and several projected radials, also laid out so as to give equal service to the entire territory. The area between these main thoroughfares is considered as devoted to local and secondary traffic only.

The master plan uses four standards of width.

1. One hundred and twenty feet for interior main thoroughfares and exterior mile section line roads.

2. Two hundred and four feet for super-highways 3 miles apart connecting with 120-ft. interior thoroughfares and extending from approximately the 6-mile circle outward.

3. Eighty-six feet for secondary traffic streets within the city and for ½-mile roads out in the surburban area.

4. Sixty feet for residential streets.

It is our belief that, with the automobile as an established and permanent factor to be considered in all future street and highway planning, no village or town should be laid out without its main street being 120 ft. in width and with provision for a checkerboard system of the same width at mile intervals. A wide main street in a rural community invites business because it makes it easy to park and still leaves plenty of room for through travel. According to our present view, 120 ft. of right-of-way should be the basic unit underlying all planning for future transportation.

The super-highway is made up of the elements of the 120-ft. street, only assembled in a different manner. The four tracks are laid upon the surface in a central reservation of 84 ft., while the 120-ft. street surface is split down the middle and 60 ft. placed on each side of the rapid transit tracks. This gives a total of 204 ft. If we regard the 120-ft street with its tracks underground as a two-level thoroughfare, then we can consider the super-highway with its tracks in the center as a single-level street of the same capacity. The 60 ft. of space at each side is divided into 15 ft. for sidewalk and tree planting, 20 ft. for local roadway, 5 ft. for island strips separating the local from through traffic and 20 ft. for express roadway.

To operate rapid transit upon the surface in the outlying areas would, of course, require grade separations at every half mile and mile intersection. Advantage has been taken of this to place the station at the top of these separations so that passengers alighting from the trains will pass down through the station platforms and emerge by way of the grade separation into the underpass street.

Vehicular traffic on one side of the super-highway desiring to get to the other side would use the grade separations, while subway passages for pedestrians to cross would be provided at as frequent intervals as the requirements of the territory demand. Grade separations made necessary for rapid transit purposes at half-mile intervals also make it possible, and very much less expensive than if done solely for motor vehicles only, to carry the through vehicular traffic over the intersecting streets at the same level as the rapid transit facility. No vehicle or pedestrian would ever have occasion to cross the express roadway. With through traffic carried over all grade separations at rapid transit stations along a 10 or 15 mile route, then it would be possible to give a rubber-tired transportation facility not now available anywhere in the world. Vehicles using this would travel continuously at whatever maximum speed was allowed by law. They would swing into the express roadway between intersecting streets and they would swing out just before reaching their destination or point of departure from the route.

ARRANGEMENTS FOR CROSSINGS

Wherever two super-highways fully developed in accordance with the rapid transit plan cross each other, the tracks and express roadways of one would be carried above and clear of the former street level. The local roadways of both super-highways would meet at the intersection at normal grade. The rapid transit stations would be in the center of the intersection.

While designed primarily as a combination rapid transit and surface vehicle route, Woodward Avenue, when completed as at presented planned, will consist of two 45-ft. concrete roadways 13.2 miles long with two interurban tracks in the central park strip. This is just one of a number of super-highways planned for Detroit and vicinity.

The actual improvement of these rights-of-way, while important enough, is not so vital to Detroit and the metropolitan area at this moment as is the acquisition of the land itself. What can be obtained now at relatively moderate cost would require untold millions ten, fifteen or twenty years hence. No one quarrels about how the right-of-way is going to be developed. There are, of course, differences of opinion, but these are swept aside in the universal agreement that the width is necessary and should be nailed down now.

Of the various methods of acquiring rights-of-way, the most effective and least expensive is the dedication that owners automatically make when their plats are accepted by the boards of auditors of the counties involved. Special consideration of the older sections of the city, designed long before these two new requirements of the motor vehicle and rapid transit were dreamed of, is called for. Either the older sections must be opened up by widened main arteries at regular intervals or they will suffer by reason of the bottle necks that will throttle their growth.

The master plan provides that certain routes, selected because of their alignment, continuity, relative location and connection with the outside grid, shall be widened as the needs require and funds become available, to the main standard of 120 ft. with intermediates of 86 ft. Two methods will be used;

1. Establishment of set-back lines varying from 7 to 10 ft. on a side on both sections of routes selected which are at present 100, 105 and 106 ft. in width. All told, there are 31½ miles of such route upon which it is planned to complete the condemnation of the land vacated by these set-back lines at the expiration of 15 to 25 years. In rapidly growing cities, the average life of buildings is about 33 years, which means that during the period specified for the set-back line, a very large proportion of the old structures now existing will have been replaced on the new line, and only a relatively few modern structures will have to be cut back at the city's expense.
2. By out and out condemnation to the full width desired. Development follows lines of transportation. The highest value land and the most expensive buildings front upon the transit street. To widen the street by condemnation usually requires the community to pay for the highest value land frontage and largely to destroy the most expensive buildings. When the operation is completed, the cheaper land which was formerly in the rear and which now fronts upon the widened thoroughfare steps into the same position of value as the former street frontage and acquires new value by reason of the widening. The widened street attracts a better building development, but the reduced depth of the lots is less favorable to large structures. In every way, the result is diametrically opposed to the city's and the property owner's best interests.

A charter amendment adopted by the people of Detroit will permit the Common Council to condemn property other than that actually required for the widening, to readjust lot and alley lines, to exchange one piece of property for another and, in general, to exercise the rights of a proprietor in the transaction. In a nutshell, the amendment gives the city the right to condemn cheap property in the rear of business frontage and to exchange such property for the frontage required so that buildings may be moved back upon this new property, alley and lot lines readjusted and the original owners left with the same size properties on the widened street that they originally had on the narrower one.

The financing of these city condemnation proceedings will be taken care of on the basis of approximately two-thirds against the benefited property in an assessment district, running back on each side of the thoroughfare widened, and one-third in an assessment upon the city at large.

Much more could be said about planning for future transportation, its advantages, methods and Detroit's accomplishments to date. Sufficient has been said, however, to show why every village, town and city should adopt its own master plan, together with adequate standards of width for the various elements and then concentrate upon the earliest acquisition of the desired rights-of-way. Planning ahead of immediate needs benefits most the territory that adopts such plans.

In older cities, we have seen areas that were once the heart of business, city government and the social life of the community finally reach the limit of possible development upon the narrow street system of the past. We have seen these areas forsaken and become blighted in favor of new areas offering better facilities of all kinds required by the increased population and altered conditions of living. The time finally arrived when it was cheaper to move than to rebuild.

History has proved over and over again that we pay for adequate facilities whether we have them or not. We pay through delays and reduced efficiency. We pay through nervous wear and tear, through loss of property, life and limb. We pay in stunted development, in blighted areas and lessened values. And as a last resort, we pay enormously for a few defensive measures that too often fail because inadequate. It is better to grasp opportunity while it exists and consistently plan ahead of immediate needs than let things drift until it is too late.

Competition, Co-ordination or Monopoly*

Advantages of Individual Enterprise and Effort Can Be Retained Without the Evils of Wasteful Duplication of Service

By the **Right Hon. Lord Ashfield**

Chairman Underground Railways of London,
London, England

URBAN transport is a complex subject. The underlying principles which may govern the operation of such undertakings are three, contrasted and opposed, namely, competition, co-ordination and monopoly.

For the interpretation of these principles it is necessary to turn to the inexact science of economics. The main ideas of economics took shape about 1776, for in that year Adam Smith published his "Wealth of Nations," which gave form and definition to a hitherto unorganized mass of knowledge. Adam Smith was an individualist. He saw that all achievement and all success were attributable to personal effort, and so it was quite natural that he should think that competition was inevitably concerned with vital impulse. When, in 1859, Charles Darwin published "The Origin of Species" and established another landmark in the history of thought, he seemed only to confirm the rightness of Adam Smith. Achievement and success in evolution were based upon a struggle for existence, which was competition naked and unrestrained.

By a curious coincidence, Karl Marx published in the same year his "Critique on Political Economy," which eight years later was to be recast into his famous treatise on "Capital," in which the doctrine of the other extreme, of socialism as the negation of competition, finds its dominant utterance. The facts of life were beginning to shatter the hardness of the teachings of the orthodox economists. From that year onward criticism and discussion have attempted to fashion a new economics, but with too little success, because the old had become consecrated and was accepted unreasoningly.

Out of evolution, however, the idea of co-ordination starts. The struggle for existence was found not to be so universal or so acute. There were associations of creatures for their mutual protection and benefit; and what the creatures did man learned to do. Slowly there sprang into existence trade unions which limited labor competition, buyers' and sellers' organizations which limited trade competition, and trusts and cartels which limited competition in the markets for raw and partly manufactured materials. Nevertheless, while the practice was changing year by year until the economic life of nations has become radically altered, there is still the same lip service by large sections of the community, to the notion that competition alone is essential, beneficial and advantageous.

It is against such a background that the idea of co-ordination, as opposed to competition on the one hand and to monopoly on the other hand, should be viewed, and urban transport is a favorable subject for the purpose of illustration.

Transport consists in public service. The service may be measured statistically in seat-miles. The use of the service may be measured in passenger-miles. If the seat-miles are not used by passengers and so converted into passenger-miles, they are lost. In this the provision of service must be distinguished from the provision of commodities. If commodities are not sold one day, unless they are perishable they may be sold the next, but service, once provided, is wasted unless it is used. Waste is costly. The whole service must be paid for out of the proceeds of the part which is used. If, therefore, the proportion wasted is, by reason of competition in services, increased, the amount charged by way of fares to the passengers must be raised. A substantial proportion of the total service provided by urban transport undertakings is wasted in any event by the operating conditions occasioned by the variable flow of the traffic—the unbalanced inward and outward movements morning and evening, the irregular movements at mid-day, the seasonable and climatic variations which can hardly be forecast with exactitude. Whether railways or tramways or motor omnibuses are taken, in Greater London the average use which is made of the facilities provided barely exceeds 33 per cent. In the cities of America it will not be greater; it may easily be worse. Only by unified management of all the means of transport and their co-ordination into a general system can such unavoidable waste be reduced to a minimum.

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*Abstract of a paper presented at the Annual Convention of the American Electric Railway Association, Cleveland, Ohio, Oct. 4-8, 1926.

Transport in its commonest forms occupies the public streets. The traffic capacity of the public streets is limited. A single line of traffic will accommodate some 500 vehicles per hour in a congested street. If a wasteful use is to be made of the public street, if the vehicles using the street are to be only partly loaded, or if the general speed of movement in a street is to be slowed down by congestion due to too many vehicles trying to squeeze through, then vast and needless expenditures are forced upon the community to supply more and wider streets. In the centers of modern cities this has already become a grievous and almost insuperable problem. It is certainly not to be aggravated by countenancing the needless competition of omnibus with omnibus, or of omnibus with tramway upon the public streets.

But if competition fails, is the only alternative monopoly in one or other of its forms? There is the monopoly which is characterized by private exploitation. This can be ruled out at once. There is the thinly disguised monopoly of nationalization or municipalization in which the exploitation of the consumer is obviated, but at the price of retaining all the other defects and vices of monopoly, such as its lag on progress, its conservative methods, its stereotyped management, its infallible tendency to live upon itself in an atmosphere of red tape. It is idle to shirk the consequence of these disguised monopolies, for they are too patent. In co-ordination a golden mean is available which allows of the retention of what is good in individual enterprise and of the casting out of the ills of competition.

Changes have been wrought in trade and industry since 1860. Large undertakings, such as those providing urban transport, have become impersonal. They are in these days joint stock companies. Those who manage and control them are salaried officials, trained and expert in their work. They form a class whose duty it is to hold the balance between the shareholders and the passengers. They have built up a technique of management which they must observe conscientiously. There is no longer a mystery about it, but it has become something in the nature of a science. A change has taken place similar to that which converted alchemy, with its uncalculated magic, into chemistry, with its calculated wonders.

Finally, and maybe most important of all, publicity has entered into management. What is done in the office is shouted in the press. Management is being conducted in a glass case, so that any attempt to surcharge the public, or impair the service, or to squeeze an excess profit, fails immediately under criticism from the public.

Traffic has grown more full of variability as cities have grown in size and strength. This variability never allows of rest in urban transport. The incentive to improvement, to expansion is always there. For instance, competition remains in the design of vehicles and equipment because the vehicles and equipment must be tuned up to yield the last passenger in effectiveness. Every second of waste must be eliminated, every inch of space must be exploited. The basis of prosperity in urban transport is not a few passengers at high fares, but many passengers at low fares. These are some of the considerations which point to the truth that in urban transport, at any rate, the atmosphere, the circumstances in which it is carried on, are instinct with a spirit of competition which makes its pressure felt in subtle and impressive ways, which insures an accommodating and progressive attitude, which renders harmful and dangerous the rude competition of vehicle with vehicle and system with system. Urban transport has outgrown the stage at which tribal warfare represents the solution of the difficulties of existence.

What is meant by co-ordination? There is no one answer to such a question. Each city must work out its own. It does not necessarily involve all transport agencies being in one ownership. It does not necessarily involve all transport agencies being under one management for the routine discharge of their operations. But somewhere there must be the power and authority to insure that the operations of all the transport agencies are knit together into a systematic whole. Somewhere there must be the power to readjust the financial position of conflicting agencies to insure that whatever their ability to earn may be, all receive according to their needs, if their service is required.

In all cities there is the right, on the part of the people, to exercise control, subject to the observance of certain principles. First, that those who control shall not be interested in one transport agency more than in another. They cannot own one agency and seek to control others. They must have a single eye. Second, that the transport agencies as a whole shall be self-supporting, or if that is not to be the case because cheap transport is held in such esteem as to warrant a tax or impost on the community in some other shape, such as a charge on landed estates, a rate on property, or a levy on industry at large, then a definite policy of subsidy out of such other resources shall be defined. Third, that those who invest their money in urban transport shall be entitled to a reasonable and proper return upon their capital, for, without this, expansion is prohibited. Indeed, as a price of control there is a fair claim to a guarantee. Such an investment, under such conditions, should be almost like a government or a state security; that is, a fixed interest bearing security; in brief, a bond.

Finally, co-ordination, it will be observed, does not absolutely forbid competition. It requires that so long as adequate service at fair prices is provided, there shall be no disturbance to provoke rate wars, or to stir up overrunning, or to attract gambling investments and so to cause waste. If, however, at any moment, those who are engaged in the provision of urban transport are neglectful or dilatory or unreasonable, then the door can be opened and fresh agencies invited to take a share. Co-ordination is a closing of the door to direct and internecine competition in the interest of the transport undertakings so long as they are of good conduct and act in the interest of the public.

Need for Revision of Our Concepts of Depreciation*

Modern Ideas of the Permanency of an Essential Utility Require a New Method of the Treatment of Depreciation in Considering Property Value

By **Prof. Henry E. Riggs**
University of Michigan, Ann Arbor, Mich.

MAJOR concepts described by the word "depreciation" are radically different. They may be described as the "valuation concept" and the "accounting concept."

The general use of the term "depreciation" in valuation commenced with the Michigan Railroad appraisal of 1900, although I find one very clear statement of the same conception in connection with a bridge controversy as early as 1840. The Michigan appraisal was begun in September, 1900, and finished the following February. The total cost to the state in round figures was $70,600, and the theory of making an engineering estimate, or cost of reproduction, was there first used.

PROF. H. E. RIGGS

This work was done in connection with a study of taxation. The railroads all contended for low values, and the estimated cost of reproducing the property at that time very closely approximated actual investment. It gave the answer in terms of a new railroad. Many of the more than 150 operating railroad properties in Michigan were in sadly run-down condition. They had actually depreciated and were not earning any adequate return. To assign a value equal to the cost of building new in 1900 would have worked an injustice to such properties. Hence the attempt was made to set up a cost of "reproduction less depreciation."

The concepts adopted at this time, cost of reproduction, cost of reproduction less depreciation, the method of arriving at the so-called depreciation, the general methods of making the inventory, the forms for the inventory and the general form of the presentation of final details and summaries were adopted in subsequent valuation work and followed with relatively slight modification.

It must not be forgotten that this work was done seven years before the adoption of uniform accounting and nine years before the Supreme Court rendered its decision in the Knoxville Waterworks case. Those two events ought to have brought about a complete revision of the methods of computing "depreciation," but they did not.

The Knoxville case makes clear that where there is depreciation it shall be found and deducted. It does not, however, define depreciation beyond making it clear that it must be impairment of the investment. The fundamental thing about that decision is the declaration that it is the duty of the owner to "maintain his investment intact, as it was in the beginning." In other words he must keep a 100 per cent property. If he fails to do so the fault is his own and must be taken account of when a valuation is made. The Michigan plan of determining depreciation is inconsistent with this decision because under it no property can ever be in 100 per cent condition.

The uniform accounting classification draws a very clear and sound distinction between the capital accounts and operating expense accounts. It gives a clear recognition of the principle that the using up of consumable units of property is part of the cost of operation.

MICHIGAN PLAN IS FAULTY

The Michigan plan of determining depreciation is inconsistent with this classification because it considers progress toward the time of replacement, or operating costs not yet accrued, as being a deduction from capital.

It seems to me that the Michigan plan, which has been adopted practically in its entirety by the Bureau of Valuation of the Interstate Commerce Commission, is faulty in several respects. There are several question to which we must find new answers.

1. *What is the unit of property to be valued?* The

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problem is to value the railroad. A railroad is very distinctly one property, built for a special, particular service. Most of the materials composing the property have no value at all except as part of the railroad. For example, the rails, the signals, a depot building, a fuel station have little "value" when detached from the railroad. They are all consumable parts. They were made to wear out. The better the railroad and the more its business the faster they wear out. Their wearing out is an operating expense. They are distinctly not units of property to be valued alone, any more than the windshield, fenders or tires of an automobile. The study must be, therefore, of the utility as a whole, not of its minor parts.

2. *What constitutes a 100 per cent property?* There never was such a property. Newness is of no value, and if we sought mere "newness," how much money would be invested in our utilities. The efficient property, built to render a particular service, and doing its work in a safe, efficient and economical manner, is the thing which attracts investment. Such a property, with all replacements being made just as soon as replacement is due, is the 100 per cent property. Where maintenance is not kept up, and where replacements are long deferred, there is depreciation in the sense it is referred to by the courts. It seems to me that depreciation, in the sense of failure to maintain the integrity of the investment, is measurable in dollars and cents, by the amount of money that a wise and prudent manager would be justified by sound economics in spending to bring the property up to a proper and safe standard for transacting its actual business.

3. *What is depreciation?* The Interstate Commerce Commission defines it as "loss of capacity to serve." The Supreme Court makes very clear that it means "failure to maintain the investment intact." In view of the fact that we are not now discussing value but property, this might be stated as follows: "Failure to maintain the plant or property intact, which was secured by the investment." The basic definition is "loss of value."

I do not think that we can avoid the fact that value itself, particularly as it relates to utility properties, is dependent on earnings. We may very naturally expect to find that the poorly conceived, poorly located property, which has never come up to expectations, which is not doing the business that it should, and is consequently not paying an adequate return, will be the poorly maintained property. Any formula which deducts a greater percentage of depreciation from an old, well-established, prosperous and growing utility which is fully maintained to the highest degree of efficiency than it will from the ill-conceived failure which is not fully maintained but which was built at a more recent date is an incorrect formula.

The speaker would define depreciation as that loss of value or impairment of the investment in plant which is due to the failure of the owner fully and properly to maintain to a suitable standard for the service which is to be rendered.

4. *What is the life of the property?* This conception of the total life of the unit, applied to minor consumable parts, has led to the most ridiculous inconsistencies. For example, steam railroad ties are assigned a definite life. Assuming full maintenance, the replacement each year of every tie that ought to be replaced, the maximum normal condition of the ties is 50 per cent. Grading, on the other hand, never depreciates. That is because the engineer doing the work of valuation would have to put a "life" on cuts and fills, and he cannot do so.

The real answer is that both ties and grading have a life as long as that of the railroad. If the railroad is abandoned, what is more worthless than an abandoned grade? We all know that cuts and fills wash and slide and that as constant maintenance must be expended on the grade as on the track. Certainly the life of a service structure as a whole is the true measure, not the estimated lives of parts of it. Who knows the life of a railroad, or an electric power property, or glass, or grading, or a great dam?

We must establish a new set of concepts in valuation. We must abolish guess and substitute fact. The application of the formula of the Bureau of Valuation means a deduction, based on an arbitrary set of rules, of from 20 per cent to 25 per cent of invested values in the railroads. Say four to five billions of dollars. Doubtless in some cases of small properties of low earnings there is considerable true depreciation, but in the case of the great majority of the railroads of the country the formula results in confiscation.

Thus far I have discussed the valuation or engineering concept of depreciation.

THE ACCOUNTING CONCEPT

The accounting concept is no less important. It seems to me that the use of the word "depreciation" in connection with reserve accounting is a misnomer and ought to be abolished.

There can be no disagreement as to the desirability of establishing accounting reserves to spread the costs of retirement or replacement over a reasonable period of years, in the case of some properties and some parts of other properties. There is, however, great disagreement when it comes to a universal requirement of reserve accounting.

The great railroad, with thousands of miles of road and thousands of cars and locomotives, may find its maintenance of way and structures or maintenance of equipment total expenditures so uniform year after year as not only not to require the establishment of reserves, but as to make it highly undesirable, because of the introduction of estimates.

What is true for the great railroad may not apply at all in the case of the small road. It appears to the speaker that whether or not reserve accounting shall be used, and if so the extent of property that shall be covered is largely if not wholly a question of policy to be decided by the management subject to the approval of the regulating body, and not a matter to be disposed of by the formulas of some bureau of control.

The question may be asked, are such reserves, if they are established, to be based on a percentage of property cost, or on costs per unit of service? But is not this wholly a matter of convenience in accounting and of securing enough money for the purpose?

When these reserves were first established it is easy to see that a good supporting argument for them was that there was a depreciation in the property over and beyond maintenance and renewals. Indeed, that is very true as to many kinds of property today, but does it apply in the case of the utility of continuing life?

Take the case of the New York Central Railroad, for example. Is it not getting better and larger and stronger each year of its history? Is it possible to go back and find this fantasm of depreciation and add up in dollars what it now amounts to? I think not. The life of the New York Central and the other great railroads is, so far as we can now see, indefinite if not infinite.

Transportation, public transportation in cities, electric power, public water supply, communication by telephone or telegraph are public services that must continue in some form.

We know that great changes have taken place and will take place. New inventions involve constant changes of equipment, but we have well established the principle that the wearing out of the old is part of the cost of service and the cost of the old must be charged to operating expense. In the case of the continuing, going concern property any reserves raised to cover this cost are not depreciation reserves, although they may properly be such in the case of the obsolescent and dying property. My plea to you men in accounting is to find another name which will cause less of confusion and be more truly descriptive.

Deduction of Reserves to Determine Value

Finally, I would raise this question, Should the amount of accumulated operating expense reserves be deducted from the capital account to find true value?

The Supreme Court, in the Knoxville case, says that it is the duty of the owner to keep his investment intact.

This can be done in two ways on different properties. One may so fully keep up current repairs, replacements and renewals that at any given time little or no depreciation ought to be found. Another, unable to do this by direct charges to operating expense, may elect to create reserves, and through a series of years just as fully maintain the integrity of the investment. Should he be penalized by deducting these reserves from capital?

Would it not be more proper, in this second case, to say that failure to establish proper reserves is failure to keep the investment intact, and that such failure should be penalized?

This whole subject of reserve accounting is, like engineering valuation, a new development. The subject is far from being a fixed and settled science, and the accounting question needs just as much study as that of the proper deduction to be made in valuation.

The definite use, and the clear meaning of the word depreciation, loss of value, in valuation, and the clear-cut order of the courts to find it when it exists and deduct it, seems to make it very essential that the accountants get down to exact terminology and find a name that shall be truly descriptive.

Rail Corrugation Studies to Continue

PLANS for the continuation during the coming year of the work of the committee on rail corrugation were made at a meeting held Oct. 6 in the Engineering Room of the Auditorium. Methods of using the corrugraph were discussed and arrangements made for metallurgical analyses of sections of corrugated rail.

This subject has been one that has baffled engineers for many years and it is to be expected that with the approach to this problem along scientific lines that the cause or causes resulting in corrugation will be discovered.

Purchasing Agents Meet

Many Details of the Best Way to Handle Their Work Were Discussed by Both Railway Men and Manufacturers

FOR the third consecutive year, the purchasing agents and stores committee of the Engineering Association held a separate session at Cleveland on Oct. 5 to consider its report to the Engineering Association and, at the same time, to hear addresses from prominent men on the subject pertinent to the committee's work. After the address of welcome by Charles R. Hârte, president of the American Engineering Association, Frank R. Coates, president of the American Electric Railway Association, gave a talk on the value of the purchasing agent to the entire railway organization.

P. F. McCall, chairman of the committee, read the formal report which was presented Thursday morning to the Engineering Association. Other committee reports were read and approved.

The principal paper scheduled on the program was "Co-ordination of Operating Budget with Purchases of Material." It was presented by Dr. Charles Reitell, head of the department of accounting and industry, University of Pittsburgh. According to him, the budget of requirements should be worked out by forecast, plus experience and adjustments. Estimates should be made for the month, and the various items tabulated on a budget sheet which can be laid out to accommodate as many divisions of the work as are required. The big underlying principle of budgeting is the psychological effect it has on the purchasing department. Abnormal expenditures which are not included in the budget should be passed upon by a group of officers of the company which may be authorized to draw upon a contingent fund to meet the emergency requirements.

What Constitutes a Valuable Employee

Four factors characterized a valuable electric railway employee, according to W. E. Wood, vice-president and general manager of the Virginia Electric & Power Company. These are general knowledge of the company's business, specific knowledge of the detail work of his department, a desire to carry out the policies of the company and co-operation on his part with other departments.

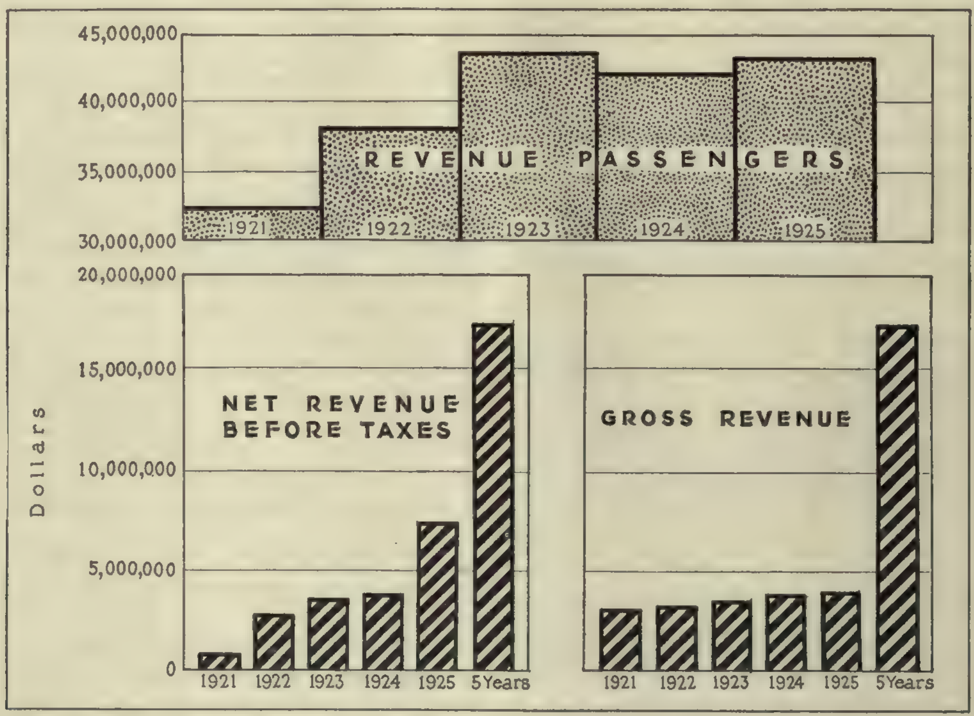
Time can be saved in filling orders if the proper description is given the manufacturer so that his order department may successfully interpret the company's order. Henry S. Day, manager transportation division, Westinghouse Electric & Manufacturing Company, in his paper enlarged upon this statement and, in addition, said that his company had had considerable success in filling orders from catalog descriptions. According to Mr. Day, some railway purchasing departments permit an order to go through in rather incomplete form.

This is not good practice. Attention must be paid to details, in order that the material shipped on the order will be correct. It is up to the manufacturer to keep the purchaser supplied with new catalogs. However, it is also necessary for the manufacturer to maintain a file of back catalogs because orders may come in which an old catalog description is given. Ordering by unit quantity packages speeds the shipments. This practice is economical and facilitates the work of the purchasing department.

Penn-Ohio Electric Company Wins Coffin Award

An Aggressive Campaign of Physical Improvement and Co-ordination of Rail Lines and Buses, Combined with Intensive Merchandising Effort, Earn National Recognition for Moderate Size Combination Property

REHABILITATION of its railway property with a view to building up a character of service which could successfully compete for traffic under modern conditions was a large factor in winning for the Pennsylvania-Ohio Electric Company, the 1926 Charles A. Coffin medal. The award was made on the basis of the value of the accomplishments by this property to the public and to the electric railway industry as a whole. Concrete evidence of this company's intention to provide a complete modern service and of a constant effort to improve facilities, which in turn won the co-operation of the public and a resultant considerate attitude in franchise matters, assessments, etc., was cited as among the important accomplishments.



The committee in making its report also cited the action of this company in pioneering the operation of de luxe buses in an industrial territory while at the same time avoiding the temptation to hold bus fares below the cost of giving service. In addition, mention was made of the effort by the company to give a different character of service with de luxe buses than on the railway. Establishment of the precedent that the bus fare under such conditions should be higher than the rail rate was recognized as an important accomplishment.

In the judgment of the committee, the winning company has shown by experience that there is no permanent "rubber urge," but that the public is ready to buy what it considers the greatest value for its money in transportation regardless of the motive power. While building its bus service this company brought its rail lines up to a state of performance which permitted the proper field for each to be determined. Having gone through a complete cycle of shifting traffic between cars and buses, it established the fact that the latter may be used to attract new business to a transportation system as a whole, while improved cars and service simultaneously build up the riding on the rail lines alone. It demonstrated that when the bus is operated under conditions for which the car is better fitted, improvements can be made in the rail service which draw traffic away from buses of even the most luxurious type. It found that when both bus and car service are intensively developed in comfort, speed and convenience, and are operated at rates of fare proportionate to the cost of giving service, neither vehicle threatens to supplant the other; that the field of each is fixed by the nature of the territory, location of lines and other similar factors.

The Pennsylvania-Ohio Electric Company operates both city and interurban service by cars and buses. The one management operates the Youngstown Municipal Railway and the lines serving Newcastle and Sharon, Pa., Niles and Warren, Ohio. Five years ago buses and private motor car competition had the company with its back against the wall. It had to choose between admitting defeat or putting more money into its property and adopting more aggressive sales methods. Choosing the latter, it has emerged triumphant after five years of vigorous fighting. This property is controlled by the Republic Railway & Light Company of Jersey City. C. C. MacCalla is general manager and R. N. Graham is manager of railways and directly in charge of rail and bus operation.

American Committee Reports Record of Year's Progress

The Subjects Considered This Year Included National Relations, Management and Operation, Insurance, Education, Rapid Transit and Publicity—Useful Research Work Accomplished

BEGINNING with the convention last year the presentation of committee reports from the platform was discontinued by the American Association. The same plan was followed this year. Instead of reading the reports from the platform as in previous years, each chairman gave a brief oral résumé of the subjects presented. These topics were printed in pamphlet form by the association and distributed to the members before the meeting, allowing them to become conversant with the subject matter and enabling them to bring up questions for discussion after hearing the preliminary remarks by the chairman. Abstracts of the various reports follow.

National Relations

THE current year has furnished many things for consideration by the committee. At the hearings on the railway labor bill before the Senate and House committees, Mr. Henry and other representatives of the association argued for the exemption of street and interurban electric railways, and this exemption was secured by the Richberg amendment. A statement setting forth the views of the association with reference to the railroad consolidation bill, introduced by Senator Cummins of Iowa, was filed with the committee. This bill was still in the Senate at the time of adjournment. Mr. Henry and other representatives of the association have also closely followed or have spoken at hearings on the so-called "venue bill," a bill relating to railway mail cars, the use of steel cars in trains, excise taxes on automobile buses and parts, and the regulation of interstate buses and trucks. The association has also been represented at various hearings held by the Interstate Commerce Commission in different cities this summer on the question of the regulation of such interstate buses and trucks.

HARRY REID
Chairman

Mr. Henry also spoke at a hearing of the House committee on interstate and foreign commerce on a number of bills proposing to amend the interstate commerce act.

The committee on national relations has also filed with the Interstate Commerce Commission a petition, so far as its members were concerned, in regard to an order relating to the inspection and testing of railroad locomotives other than steam. It was also represented at the National Conference on Street and Highway Safety in Washington, and Mr. Henry is a member of the conference committee to draw up a suggested uniform vehicle code. It is the intention to have this code adopted in the various states.

During the year a large number of Congressional bills, resolutions and amendments were mailed to Messrs. Storrs, Henry and Welsh, as well as to others on request, as were also many copies of Interstate Commerce Commission orders, notices of hearings, etc., and six decisions of the United States Supreme Court and district courts. Many requests sent to the Washington office for information, etc., were filled, and the committee points out that this is a service which its Washington office is able to give association members. It also points out that all electric railway companies doing an interstate business and therefore required to appoint statutory agents in Washington, upon whom the commission may serve notices and other papers for such companies, can appoint as such an agent Mr. Henry, who has supervision of the Washington office. He will see that these notices are sent to the various companies and they need appoint no other statutory agent.

The report contains resolutions on the death of W. H. Maltbie, who had been retained as counsel in the preparation of the association's case on the subject of depreciation as well as of its presentation before the Interstate Commerce Commission. Mr. Nash has taken over the work which Mr. Maltbie was doing for the sub-committee on depreciation, and all the data which have been assembled have been turned over to him for analysis.

The report was signed by E. J. Bechtel, R. R. Bradley, A. W. Brady, C. D. Cass, S. F. Curwen, J. H. Hanna, G. H. Harries, C. L. Henry, Frank Karr, T. O. Kennedy, H. A. Mitchell, L. R. Nash, Frank Silliman, Jr., D. W. Snyder, Jr., F. H. Wilson and Harry Reid, chairman.

Rapid Transit

COMPILATION of opinions and statements from authoritative sources as to methods of financing rapid transit, distribution of benefits, and advantages to be obtained from rapid transit in its various forms to suit different conditions constituted the work of this year's rapid transit committee. Data were compiled to indicate the amount of the toll charges to the passengers using existing structures and the possibilities of improvements in service or reduction in fare if the fixed charges were distributed according to benefits received. Other data show the relative costs of providing transportation capacity by subways or streets in the different cities.

G. A. RICHARDSON
Chairman

Specific conclusions as to methods of financing or types of construction were not made, since local circumstances and requirements of law or precedent determine the detail of the plans that would be applicable or desirable.

Development of plans and proposals for rapid transit has received much attention in recent years, due to the great need for additional street space and for more freedom of communication. Projects for immediate construction are being discussed in six cities, although actual work is in progress in but two.

Such questions as the desirability of concentration of the business district, the effect of rapid transit on a city plan or vice versa, the ultimate condition to be attained in transportation and in the city plan are vital when considering such very large, present and future expenditures involved.

The body of the report consists entirely of excerpts from and comments on rapid transit reports submitted in a number of cities. The report is divided in sections as follows: (1) Opinions and practices regarding financing; (2) effect of fixed charges on fare and service; (3) comparative costs and capacities of streets and rapid transit lines; (4) arguments for rapid transit and for special designs.

The report was signed by J. H. Alexander, H. L. Andrews, W. B. Bennett, Edward Dana, S. E. Emmons, B. J. Fallon, R. F. Kelker, Jr., E. J. McIlraith, W. S. Menden, F. R. Phillips, F. H. Shepard, C. E. Smith, J. B. Stewart, Jr., D. L. Turner, James Walker and G. A. Richardson, chairman.

Publicity

THE outstanding accomplishment of this section has been the compilation and issuance of a loose-leaf advertising book containing samples of more than 2,500 ads and posters dealing with the following subjects: Courtesy; Safety; Weekly Pass; Taxes—Paving; Parking; Motorists; Franchises; Intercity; Buses; Merchandising Transportation.

This is the largest book of its kind ever issued by any industry, and represents effort extending over practically the entire year. It is believed that this book will be of invaluable assistance to advertising men by way of offering suggestions for copy.

An entire section of the book is devoted to a reproduction of advertising material prepared by the association, and still available through the advertising section, for the use of companies. This material, which can be had in poster or newspaper mat form, or both, covers a wide range of subjects, including safety, traffic congestion, and paving tax relief, three of the outstanding problems now before the industry. The size of the material, prices charged and all other details for ordering it are plainly set forth in the book.

The industry is particularly urged not only to make use of the material now on hand, but to send suggestions for other material to the advertising director. The committee will gladly consider any suggestions.

Two of the latest series shown in the association material section deal with advertising supplemental coach service and obtaining paving relief.

The coach advertising material comes in mat form for two-column newspaper ads. The text suggests using the company's coaches when it is impossible to use its street cars. Sales arguments for using the coaches for sightseeing, special parties, etc., are included.

The new paving poster series deals with instances in nine states where companies have been relieved of paving charges. They not only give the facts about the relief, but also carry illustrations designed to impress the reader with the unfairness of imposing a paving charge now that the horse no longer is used in street car service. These posters come in two colors, red and black, in the regular window poster size, supplemented with suggested newspaper ads, also shown in the association section, and should be very helpful to any companies launching a paving tax relief campaign.

The book also contains an introduction by the advertising director embracing a general discussion of the best advertising methods. It deals extensively with the use of type and the utilization of newspaper space.

A survey, which was noted in a full-page story in the *Editor and Publisher*, the outstanding newspaper man's magazine of the United States, showed that between $4,500,000 and $5,000,000 was spent this year for electric railway advertising.

PAUL SHOUP
Chairman

The section also was active in aiding in the inauguration of the speakers service. The director prepared, printed and distributed seven standard addresses throughout the industry. These addresses dealt with the following subjects: Tax Situation; The A.B.C.'s of Operation; Municipal Ownership; State vs. Municipal Ownership; Coordinated Transportation; Transportation History; Future Transportation.

The addresses were prepared under the direction of Britton I. Budd, chairman of the speakers committee, and were compiled in such handy form that they might be delivered by the most inexperienced public speaker without difficulty. This new feature of the section's work will be continued through the coming year in co-operation with the speakers committee.

The managing director's office has furnished much material which has been helpful in obtaining publicity. Speeches and statements delivered by the managing director have been broadcast through the regular publicity channels. A standard size booklet has been adopted for the managing director's statements and it is available through the association at all times. Addresses by the president have been handled similarly.

The committee recommends that the advertising section, and the industry, during the next year do its utmost to familiarize the public with and encourage the putting into effect of the fundamentals as set forth in the Advisory Council's report.

Subjects which should be stressed most are traffic congestion relief, tax adjustments and safety. Of these three, traffic congestion relief should be given particular attention in posters and advertising material.

The work of the speakers committee of the association is most important and should be given generous support by the advertising section. Additional addresses, along the lines of the seven prepared this year, should be prepared during the coming year and given the widest possible distribution among executives.

The industry as a whole should spend more money for advertising, and put more concrete sales talk, and not so much good will material, into its copy.

More attention should be paid to good art work by local companies. Good illustrations help sell rides. Poor ones do not. Be at least as careful in the selection of a man to do your advertising art work as you would in the selection of a man to decorate your cars.

The report was signed by F. L. Blanchard, J. S. Bleecker, V. H. Cartmell, H. O. Crews, Robert Dougan, P. H. Gadsden, L. E. Gould, J. P. Griffin, W. V. Hill, W. H. Hodge, H. M. Lytle, J. C. McQuiston, M. P. Rice, W. P. Strandborg, P. L. Thomson, R. G. Tucker, A. C. Watt, E. F. Wickwire, Barron Collier, vice-chairman, and Paul Shoup, chairman.

Management and Operation

NOTEWORTHY work was done by the committee on management and operation during the past year. Its report, abstracted below at considerable length, indicates the character of its activities. In addition to the main report, each of the regional directors submitted a report giving in greater detail the accomplishments of the year in his territory. These reports indicate that interstate bus competition is a major problem, although the bus in general has been accepted as one of the common parts of the service of many railways. The majority of these regional reports contain a great deal of information gathered from personal visits to the various properties.

When the 1925 committee on management and operation presented its report, it was recommended that the work be discontinued during the present year. The association, discussing the report at the 1925 convention, decided that it would be desirable for the committee to continue its work as originally assigned, but devoting more time to the dissemination of information collected in previous years. That information was classified by last year's committee and was edited and published early in this year in the form of a "Handbook of Modern Methods and Practices."

The handbook is a bound volume of 319 pages, divided into twelve general subjects covering important phases of management and operation of transportation companies. It contains the best of the information collected during the past two years and its purpose, as stated in the foreword, is to spread the gospel of modernization, efficiency and public accommodation to the electric railway industry. More than 900 copies of this book have been purchased by the industry.

In addition to the dissemination of information already collected by previous committees, the members made a special effort to acquaint not only executives but department heads regarding activities at association headquarters. A pamphlet was prepared, and distributed by committee members, describing these activities and showing how the association renders valuable assistance to member companies.

The committee co-operated with the committee on education and distributed in pamphlet form some very interesting information prepared by the latter committee. Executives of the properties visited were urged to inaugurate some form of employee educational work.

Members emphasized the value of the state public utility information bureaus, and urged executives of the properties visited to make greater use of those facilities. Information prepared by Mr. St. Clair, outlining the activities of these bureaus, was distributed.

The returns from the regional directors indicated that approximately 125 companies were visited during the year. Reports have been received from the committee members outlining various interesting practices in use on the properties visited and indicating that progress in modernization is being made. This detailed information has been forwarded to association headquarters, where it is being reviewed and classified. There does not appear to be a sufficient volume of data to justify at this time the publication of a supplement to the "Handbook of Modern Methods and Practices." The committee therefore has decided to hold the material at association headquarters, where valuable use can be made of it by the association's bureau of information and service. Should the work of this committee be continued at some future time, the information will be available for publication if found desirable.

IMPROVED CONDITIONS FOUND ON PROPERTIES VISITED

Although the competition from the private automobile continues to be a major problem of the industry, this year's survey indicates that electric railway companies have a keener appreciation of the methods which must be employed to regain the traffic which has been diverted from the public transportation systems. The motor bus, though still a competitor in some places, does not present the serious problem that it did in the past. This is due largely to the fact that electric railway companies are steadily making increased use of motor buses to supplement and round out their own service. A lack of proper regulation of interstate motor bus carriers has caused serious competition in some districts. This condition has been recognized by the Interstate Commerce Commission, with the result that a series of hearings have been held for the purpose of determining what legislation should be recommended for enactment by Congress to provide reasonable and adequate regulations.

R. F. CARBUTT
Chairman

Reports from the various districts indicate that those companies that have purchased new equipment recently are beginning to reap the benefits in increased patronage revenues and improved public relations. Many of the properties visited are contemplating the purchase of new rolling stock and are carefully studying the latest developments in car design with a view to making their equipment more attractive and comfortable. On some properties where capital has not been available for the purchase of new equipment, extensive rehabilitation of old equipment has been undertaken, with the result that there is general improvement in the appearance of rolling stock throughout the industry.

Reports indicate that there is a keen realization on the part of managements that transportation can and must be sold, which is evidenced by the inauguration of commercial departments and the adoption of merchandising practices. Individual reports indicate the development of many merchandising methods which have been found effective in attracting riders and increasing revenues. Good service with modern, attractive equipment forms the basis for effective publicity and advertising to bring about better public relations. The reports made by members indicate that those companies which have modernized their methods and improved the service had not only reaped the benefits in better public relations, but had laid the foundation for increased business and adequate returns on the investment.

OPERATING ECONOMIES NOT NEGLECTED

On practically every property visited there was evidence of improved operating and maintenance methods designed to reduce operating costs. The use of modern labor-saving machinery is becoming more extensive in all departments and more attention is being paid to the development of efficient means for handling material and routing work through shops. Naturally, new equipment has fewer failures in service, so that the volume of maintenance work required on it is less than on the older equipment it replaced. The more modern cars also are better designed for accessibility of parts requiring inspection and maintenance. Power saving through the use of light-weight equipment, and labor-saving by the use of cars designed for operation by either one or two men is increasing throughout the industry.

All companies visited have been giving especial attention to accident prevention work, with the result that during the year there has been a substantial reduction in the number of electric railway accidents of all classes, even though vehicular traffic has greatly increased. This effective work is being accomplished through greater co-operation on the part of civic authorities.

J. K. PUNDERFORD
First District

W. H. BOYCE
Second District

SAMUEL RIDDLE
Third District

L. M. BROWN
Fourth District

D. W. SNYDER, JR.
Fifth District

W. H. BURKE
Sixth District

D. W. PONTIUS
Seventh District

A. LE ROY HODGES
New York State

Surveys in a number of cities which have been reported by members of the committee show that a great deal of traffic congestion is due to the unnecessary parking of automobiles on business streets. These reports indicate that more effort should be concentrated on the elimination of parking on main streets where street cars operate. In those cities where parking has been controlled, the cars have been speeded up materially, thus aiding the large mass of people using public transportation facilities to travel more quickly.

FREIGHT BUSINESS INCREASING

Reports from the central territory record substantial progress in building up freight business through improved schedules, better equipment and intensive solicitation. In some instances pick-up and delivery systems are being experimented with, but it is yet too early to report definite results from this form of service. Plans looking toward further development of freight business are under consideration by practically all interurban companies in the central territory and it is believed that this business will be the means of materially improving their earnings.

The foregoing outlines briefly the activities of the committee and the observations of the regional directors, which are given in greater detail following the report. The spirit of optimism which was noted last year is even stronger this year. Many companies find revenues increasing and although the percentage increase is small in most cases, it is, nevertheless, gratifying. The committee believes that the original purposes for which it was organized have largely been accomplished and that, therefore, no useful purpose will be served by continuing the committee activities during the coming year. It may be, however, that after a suspension of this work for a year or two it will be found advisable to resume it.

The committee, therefore, recommend that for the coming year, at least, its activities be suspended. It stated that it believes that much good comes from the interchange of views on managerial and operating problems and, therefore, recommends and urges the practice of sending certain employees, especially the department heads, on frequent trips to various railways, that they may observe the methods used on other properties and discuss their problems with others engaged in the same branch of the business.

D. E. BLAIR
Canada

The report was signed by Regional Directors J. K. Punderford, W. H. Boyce, Samuel Riddle, L. M. Brown, D. W. Snyder, Jr., W. H. Burke, D. W. Pontius, A. L. Hodges, D. E. Blair, and Members A. J. Boardman, J. B. Crawford, E. J. Dickson, F. D. Gordon, H. H. Norris, L. D. Pellissier, Alfred Sweeney, H. R. Whitney, C. F. Crane, S. E. Emmons, D. J. Locke, A. C. Spurr, J. E. Wayne, R. J. Lockwood, G. I. Plummer, G. B. Treat, V. W. Berry, F. L. Butler, Stuart Cooper, E. W. Ford, J. P. Ingle, G. H. Harris, W. V. Hill, W. H. Lines, E. H. Maggard, S. E. Mason, E. A. West, L. J. DeLamarter, J. F. Johnson, W. S. Rodger, R. R. Smith, H. E. Gough, R. R. Hadsell, J. N. Jones, R. E. McDougall, H. C. Stanton, Judson Zimmer, J. S. Hyatt, R. H. Pinkley, C. J. Griffith, W. W. Holden, S. B. Irelan, F. D. Burke, D. W. Harvey, W. G. Murrin, J. E. Watkins, Claude L. Van Auken, Morris Buck, G. C. Hecker, secretary; R. B. Stearns, vice-chairman, and R. F. Carbutt, chairman.

Education

ACCOMPLISHMENTS of the committee on education differ somewhat from other committee reports in that the principal work done by the committee has been presented to the industry from time to time during the year. This committee is not only the central clearing house for all educational activities, but it has promulgated definite plans, many of which have been put into practice by many companies during the course of the year.

The report of this committee, therefore, is more a review or summary of accomplishments than the development of any specific problems and the presentation of the conclusions reached.

In its report the committee states that the outstanding feature of the work has been the working co-operation with the committee on management and operation in promulgating educational programs. Specifically, the work of the committee has been built around the foremen's conference, this feature of utility education having been extensively developed on the Boston Elevated.

Two demonstrations have been given during the year. These were actual conferences conducted by foremen, under the guidance and leadership of H. H. Norris, educational adviser of the Boston Elevated. The first conference was given last fall in Boston before the New England Railroad Club, meeting coincidentally with the committee on education. The second demonstration was given in Indianapolis at the meeting of the committee on management and operation in January of this year. It is also planned to have a demonstration at the Cleveland convention. The idea back of these demonstrations is to carry specifically the idea of how to conduct such a conference and at the same time to indicate the value that can be derived from such meetings.

During the year the committee has prepared and issued four booklets on "Industrial Education on Electric Railways," "Starting an Educational Program," "How to Conduct Foreman Conferences," "How to Conduct Group Conferences." The text of each of these booklets is given in the appendices Nos. 1 to 4 inclusive of the committee report.

The report further states that the committee has concentrated this year on general plans for a series of conferences but not on the details of one type of conference.

Among the courses on the subject of economics has been one prepared by the Pennsylvania State College which was extensively used by properties in Pennsylvania. While the committee is not prepared to recommend the adoption of this or any other course on economics, it considers this fact of sufficient importance to include it in its report as a matter of information to the industry. The Pennsylvania State College has also in preparation a course for trainmen, the text of which is to be edited by Daniel Durie. It is expected that copies will soon be in readiness.

The report concludes by stating that the best results will be secured on any property by careful selection of the type or types of educational work to be done and by attempting only as much at a time as promises to be useful. The report further recommends that the committee be continued next year as there is a growing interest in foreman conferences, interest in which can be maintained, to the end that the results may be capitalized for the benefit of the industry.

EDWARD DANA
Chairman

The report was signed by H. O. Allison, G. B. Anderson, V. W. Berry, H. Bigelow, J. A. Dewhurst, B. W. Duncan, W. J. Edmunds, J. A. Greenland, C. J. Griffith, J. S. Hyatt, M. B. Lambert, R. J. Lockwood, M. McCants, H. H. Norris, A. B. Paterson, Samuel Riddle, A. J. Rowland, J. V. Sullivan, S. L. Vaughan, E. M. Walker and Edward Dana, chairman.

Insurance

THE work this year was confined to the collection of the experience of the industry and a study of it. Both members and non-members were reached, and replies were received from companies representing two-thirds of the capitalization invested in electric railways in the country. In the table on fire insurance experience in 1925 and 1924, included in the report, the companies are divided into two classes. Class I includes those companies which allocate their insurance according to the type of property covered; Class II, those companies reporting only total insurance carried. Only 17 of the companies reporting carried insurance in Mutuals during 1925 and 1924. In 1925 the amount of insurance so carried by these seventeen companies was $31,535,366, the premium $32,132; the rate per $100, $0.102; the amount recovered $4,856; and the ratio of amount recovered to premium 15.11 per cent.

MOTOR BUS INSURANCE

Of the 304 companies replying to the questionnaire, 114 operated motor buses in 1925, and of these 74 gave information about the bus insurance carried by them. All but three carried fire insurance and 53 carried liability insurance in addition. Property damage was carried by 28 and collision insurance by five.

The amount of the fire insurance carried by the 61 companies reporting both amount and premium was $6,435,871 and their average rate was 60.5 cents per $100. In 1924 the average rate for the 33 companies reporting both amount and premium was 66.4 cents per $100. As the rate paid on the other classes of insurance was on all sorts of bases, such as a flat rate per unit of equipment, rate per mile and percentage of gross earnings, the average rate could not fairly be computed.

Sixty-four companies reported carrying group insurance to cover accidents, deaths, etc., of their employees, and the report gives details of each case. Under the head "Unusual Insurance," the following were reported as in force by individual companies: (1) Use and occupancy insurance on carhouses and shops; (2) riot, strike and civil commotion insurance; (3) insurance on merchandise, freight and baggage when on cars, platforms or company's right-of-way; (4) catastrophe accident insurance. Brief descriptions of unusual fire prevention methods are also given in the report.

P. E. WILSON
Chairman

In conclusion, the committee points out that the newness of the bus has prevented standardization of its insurance treatment, but the opinion is expressed that the rates for fire insurance for buses, on the average, are excessive.

The report was signed by O. H. Bernd, G. H. Bourne, C. E. Brown, N. H. Daniels, F. M. Hamilton, A. D. Knox, J. H. Moran, F. J. Petura, B. L. Tomes and P. E. Wilson, chairman.

> THE officials of the A.E.R.A. and the editors of the journals devoted to the upbuilding of the industry are in an infinitely better position to analyze and demonstrate facts regarding our problems than any small group of men whose activities are localized in a comparatively insignificant part of the whole industry. It seems to be incontrovertible that the answer to the fundamentals underlying our local problems must come from men whose vision embraces the whole field. We as local men should supply them freely with whatever pertinent information we may have for the purpose of bringing out in a scientific way all of the available facts regarding cause and effect.
>
> —THOMAS FITZGERALD.

Engineering Committees Make Progress

Through Numerous Vital Reports, Knowledge Is Advanced in the Departments of Way and Structures Equipment and Power

AS IN the past, the work of the Engineering Association during this last year is represented largely by the work of its committees. The reports this year are of great interest, and the discussions at the convention centered around them. Not all the technical problems being studied by the various committees have yet been solved, but conclusive evidence of progress may be seen. Good reason exists for hoping that continued work along the lines now being followed will result in important accomplishments. The reports abstracted below are not only statements of what the committees have done, but in many cases they are permanent contributions to the fund of literature on these subjects.

C. R. HARTE
President Engineering Association

Way and Structures

FUNCTIONING this year for the first time under a new plan, the way and structures committee held no meetings, but discussed by correspondence all matters referred to it and made its decisions by letter ballot. It was not thought necessary to include in the general report of this committee the recommendations embodied in the reports of the special committees. Exceptions were made in the case of those matters not handled directly under the auspices of the A.E.R.A.

The way and structures committee approved the reports of the Division of Simplified Practice, Department of Commerce, on the conference of shovel manufacturers limiting the number of grades to three instead of four. In the case of the report under the same auspices on steel spiral rods, the conclusion was reached that three of the seven sizes now used as cores for reinforced cement columns could be eliminated.

H. H. GEORGE
Chairman

Specifications for railroad cross and switch ties were approved as recommended at a joint conference with the American Engineering Standards Committee and the American Railway Engineering Association. Three designs for 7-in. plain girder rail were tentatively adopted as American standard as the result of the work of the A.E.S.C. sectional committeee.

Progress reports only were submitted to the way and structures committee by special committee No. 2 on standardization of switch tongues and hard centers for special trackwork, special committee No. 3 on welded rail joints and special committee No. 6 on arc welding processes and repairs to rails and manganese steel. Special committee No. 7 on substitute ties was discontinued by action of the executive committee on Jan. 27, 1926, and therefore made no report.

The report was signed by C. A. Alden, E. B. Entwisle, W. G. Hulbert, E. J. McIlraith, J. R. McKay, H. F. Merker, C. A. Smith, A. T. Spencer, H. M. Steward, W. W. Wysor, E. M. T. Ryder and H. H. George, chairman.

Steam and Electric Railway Crossings

A DESIGN for manganese steel insert crossings for angles below 45 deg. to 30 deg. inclusive was recommended for adoption by way and structures special committee No. 5 on design of steam and electric railway crossings. With the addition of this design to those previously adopted, the series of designs will comprise the following:

Solid manganese steel crossings, angles 90 deg. to 60 deg. inclusive.

Solid manganese steel crossings, angles below 60 deg. to 40 deg. inclusive.

Bolted rail crossings, angles 90 deg. to 50 deg. inclusive.

Bolted rail crossings, angles below 50 deg. to 30 deg. inclusive.

Manganese steel insert crossings, angles below 45 deg. to 30 deg. inclusive.

The committee concurs in the recommendation of the A.R.E.A. track committee that crossings of steam railroad over electric railway below 30 deg. of angle, particularly for narrow treads and shallow flanges of the electric railway car equipment, should be avoided. It further shares in the general opinion that the insert type of crossings does not lend itself well for angles above 45 deg. and would not present any practical or economic advantages over the solid type in the higher angles.

In the opinion of the committee, after the adoption of the design herewith submitted, the series of recommended designs for crossings of steam railroad over electric railway will adequately cover the requirements under various conditions of traffic where electric railways cross steam railroad tracks laid with standard tee-rail. Recommendation is made that no further designs for other types be considered at this time and that the committee be discharged.

The report was signed by J. U. Bragg, James Budd, E. B. Entwisle, M. W. Johnston, E. P. Roundey, and V. Angerer, *chairman.

Buildings for Maintenance, Storage and Operation of Buses

WHILE way and structures special committee No. 9 was assigned two subjects—(1) design of buildings for maintenance, storage and operation of buses, and (2) design of joint railway and bus terminals—attention was concentrated largely on the first of these.

In garage design the salient points which the committee felt should be emphasized are:

1. Washing facilities.
2. Overhaul and repair pit facilities.
3. Lighting, heating and ventilating systems.
4. Fire insurance and protection requirements.

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*Deceased May 5, 1926.

It is desirable that there be a decentralization of washing facilities. It should be possible to wash and clean a bus at whatever point in the garage the same may be stored. Practically all recently constructed garages embody this feature, retaining at the same time the central washing plant.

Pits are used almost universally except where prohibited by city or state laws. In such places, racks or hoists serve in their place. Overhaul and repair pits should be heated, lighted, ventilated and drained so as to assure comfort and safety to workmen. It is desirable that pits be communicating when arranged in batteries. This is possible through connecting tunnels or by open end pits. An excellent illustration of an open end pit is to be found in the February, 1926, issue of *Bus Transportation*, page 102, the report states.

Any design should afford a maximum amount of light. Artificial illumination is costly. Side windows should extend to the floor as far as possible to light the under side of buses. Lights in pits should be equipped with vaporproof globes.

J. R. McKay
Chairman

Next to light in importance of design is ventilation. Gas and carbon monoxide vapors affect efficiency of workers. However, their removal because of fire hazard is equally important. While large side windows with ventilators assist in their removal, there should be forced draft and roof exhaust sufficiently large to care for ventilation aside from any windows inasmuch as in inclement weather such means are rendered useless. It is also very essential to provide pit ventilation.

There are many types of heating and ventilating systems. The type most in use for heating is the low pressure vacuum system with direct radiation. Unit type heaters are also being more and more widely used. Hot air systems in which heat is distributed through underground and overhead ducts by a blower fan are also in use. There may be some objection to these systems due to the fact that air, which is recirculated, may be gas charged and thus dangerous from the standpoint of health as well as fire risk.

The tendency in design has been to increase floor areas until there are now in existence garages of almost gigantic proportions. While it is true that lack of floor space is costly, it is equally true that insurance rates covering large areas are bound to rise to uneconomical limits due to increased fire hazards. The committee therefore feels that it should at least sound a note of warning to the industry to the end that floor areas shall be kept as small as possible and still permit efficient operation. In any event large areas should be subdivided with walls separating various operations, such as forge, inspection, battery, tire vulcanizing, etc. Gas pockets should be well drained and, as far as possible, fire hazard reduced to a minimum.

Buses, because of the fine interior finish, draperies and uphostering, gasoline, oils and greases, create serious fire risks. It is very probable, the report states, that the National Fire Protective Association will formulate rules and regulations governing points in the design of bus storage, bus terminals or bus operating houses and in this event there will be surcharges on insurance rates for buildings designed contrary to such requirements.

Sprinkler systems are not designed for large areas and have in certain instances actually failed to work at a point of immediate need. Ten sprinkler heads delivering twenty or more gallons per minute should handle an ordinary fire. When more than ten heads have been called into play, it has been a serious fire, in practically every instance with a high loss. Records of the National Fire Protective Association substantiate this fact. Sprinkler systems will not materially lessen insurance rates for very large areas.

Storage of gasoline as required by code — 30 ft. from any structure and underground—offers no serious fire hazard and from an insurance standpoint is not of such grave importance. In many instances city and state ordinances control the quantity which may be stored, also the manner of control, whether remote or otherwise.

As an addenda to the report of the committee is given a report made by W. W. Wise of a detailed inspection, from the standpoint of fire risks and prevention, of the bus garage of the Fifth Avenue Coach Company, New York.

Comprehensive descriptions are given of the Fifteenth and Cumberland Streets garage of the Philadelphia Rural Transit Company, the 41st and Haverford Avenue garage of the same company, the Union Square garage of the Boston Elevated Railway, and the Waukegan garage of the Chicago, North Shore & Milwaukee Railroad.

Concerning the design of joint railway and bus terminals, the committee does not find any new developments save that by the Philadelphia Rapid Transit Company of parking areas for motorists. At the 69th Street and Bridge Street terminals and also at 31st and Market Street this company has provided parking space where motorists may park their cars and use the suburban and elevated systems as a rapid means of transit. The fee charged for parking includes a round trip fare to the city.

Recommendations made by the committee are:

(1) That the study of the design of buildings for maintenance, storage and operation of buses be continued; (2) that a study be made of the effect of design upon fire insurance rates in co-operation with other interested organizations, and (3) that the study of design of joint railway and bus terminals be assigned to a separate committee.

The report was signed by A. J. Blackburn, G. H. Halderman, L. F. Parlette, W. W. Wise, Judson Zimmer, J. R. McKay, chairman.

Surface Hardening of Rails

PROGRESS of this committee in 1926 was confined to the tracing of wear tests and the mileage and production of treated rail. The committee's information is that in American equipment for treating rails by the Sandberg sorbitic process has been installed at only one mill. Because of the time taken to apply the treatment to each rail, it is difficult to arrange rollings so as to fill large contracts. Shipments of sorbitic rail from this plant in 1923 were 4,279 tons, in 1924, 4,968 tons, and in 1925, 2,772 tons.

A. T. Spencer
Chairman

The committee believes that the decrease in tonnage shipped in 1925 has been due to the difficulty in arranging rollings rather than to a loss of confidence on the part of the industry in the wearing qualities of the treated rail.

No additional mileage of track has been treated on this continent with the *In-situ* process since the applications on the system of the Toronto Transportation Commission in Toronto in 1922 and 1923. During the past year it has been found that the scalings referred to in previous reports have damaged the rail in certain sections to such an extent that it has been replaced after some three years of service. These defects have in practically all cases occurred where high-pressure blowpipes were used in heating the rail and where the rail itself was well worn after eight to ten years service. As noted in 1924 and 1925 reports the lower-pressure blowpipes were used chiefly on rail which had less than one year of service, and it is on these sections that comparative wear data will eventually be most reliable.

Information received from foreign systems shows the mileage treated or untreated up to February, 1926, to include original orders of 74.48 miles single track and repeat orders of 220.36

miles single track, a total of 294.84 miles. The committee was also informed that the Ministry of Transport in England has looked favorably upon the *In-situ* treatment to the extent that it is granting authority to tramways to raise loans for this purpose.

The following table has been prepared from information submitted, showing comparative wear of treated and untreated rail in England:

System	Period of Treatment Yr.	Mo.	Cars Carried	Wear of Rails, In. Untreated	Treated
West Bromwick	2	3	Unknown	0.118	0.038
Birkenhead	4	8	379,800	0.081	0.042
Blackpool	2	4	220,700	0.042	0.019
South Shields	2	11	382,500	0.050	0.022
Wallasy	3	3	828,600	0.044	0.025
Wallasy	2	9	242,550	0.042	0.021
Swansea		11	162,000	0.031	0.015
Met. Electric	3	1	145,660	0.034	0.020
Met. Electric	3	1	289,615	0.049	0.024
Paris	3	6	1,050,000	0.105	0.504

Rail profiles taken in Toronto by the committee were inconclusive but indicate that the hardened rail has shown considerably less wear than the unhardened rail under similar conditions of traffic. The committee is convinced that the Toronto experiment should run over a longer period before a definite pronouncement should be made regarding the merits of the *In-situ* process under American conditions.

The recommendations of the committee were that this subject be discontinued for one year pending development of further data.

The report was signed by C. L. Hawkins, B. P. Legare and A. T. Spencer, chairman.

Wood Preservation

ECONOMIES attained by the use of treated timber were discussed at considerable length in the report of the committee on wood preservation. It is said that in view of the overwhelming evidence from the steam railroads and larger communication companies it is nothing short of gross negligence on the part of electric railways not to fall in line to effect economies which they badly need, and to do their share in connection with national conservation of timber.

Illustrated descriptions with tables of characteristic applications of wood preservation are grouped under the captions of Ties, Poles, Bridges and Culverts, Piling, Building Material, Floors and Paving, Posts, Cars, and Miscellaneous Uses.

Information showing the extent of the use of treated timber on electric railway properties is given in a number of tables compiled from replies to a short questionnaire sent to about 140 properties. About 60 per cent of the properties replied, the greater number of which showed treated timber used in various quantities. Their figures show unquestionably that greater life is being received as the result of treating, but the period of use is too short to make definite comparisons. From a small number of replies of a selected list of properties, the committee feels that the criticism is sustained that the electric railways as a whole are not doing their part in effecting economies along the line of wood preservation.

A few outstanding examples of timber treatment are mentioned. In 1923 the steam railroads used 210 treated ties per mile, whereas the electric railways used only 13. The life of poles can be increased from two to three times by treating. During the unusual sleet storm of December, 1924, covering a strip about 100 miles wide from southern Michigan to Texas about 60,000 untreated poles went down, whereas less than 100 creosoted yellow pine poles were lost. When treated, posts will last two to four times as long as untreated, and less durable timber can be used. Parts of cars that decay in two to eight years can have their life tripled when treated.

A. P. WAY
Chairman

Cost per tie per year, including pavement replacement, on electric railways was found by a questionnaire to be as follows:

	Untreated	Treated
Bituminous macadam paving	$0.59	$0.57
Asphalt paving	1.08	0.90
Granite block paving	1.64	1.38
Open track	0.37	0.28

Savings on bridge timber were found to be $0.49 per year per thousand board-feet. On 30-ft. poles the saving per pole per year is $0.06, and on cross-arms $0.02 per year.

Material in the 1923 edition of the Engineering Manual under the subject of Wood Preservation, although revised and added to by annual supplements, was compiled a number of years ago, and in a number of instances does not apply today. It has been thought for some time that the specifications should be regrouped in a more logical order for easy reference and revised in a number of cases. The committee submitted recommendations for changes which it is felt will meet such need.

The report discusses at considerable length the development of methods of treating poles in place. Ways to increase the life of timber by means other than the application of preservatives were studied and various suggestions to this end made in the report.

Study of forms for keeping continuous records of treated timber has not been brought to the status which the committee set out to accomplish, principally on account of being unable to collect sufficient forms in use by operating companies upon which worthwhile recommendations could be made. Two forms of record cards are submitted for information, one for ties and structural timber and the other for poles. On one side, information of kind and method is to be filled out by the persons doing the treating and then returned to the purchaser. On the other side space is provided to show date and location of installation and periodical service record. A plan for marking poles is also submitted.

Wood preservatives other than creosote and allied products and zinc chloride were considered thoroughly last year and are reported on very briefly this year, because no new preservatives have been put on the market. Mention is made of the fact that some companies use water soluble salts with sodium fluoride base for structural timber, where creosote would be objectionable. At least one company is using poles so treated in city districts where poles are to be painted. Such preservatives have not, however, been used in this country long enough to determine definite results.

Four appendices are submitted with the report. Of these, three give results of various installations of treated timber, while the fourth is a glossary of principal terms pertaining to the subject of wood preservation.

The report was signed by E. H. Berry, M. J. Curtin, T. H. David, J. L. Fritsch, W. H. Fulweiler, E. F. Hartman, W. L. Harwood, L. P. Scanlan, C. A. Smith, W. F. Graves, and A. P. Way, chairman.

Rail Corrugation

ORGANIZATION of its work so that a volume of important data covering an extended period of time might be accumulated has been the principal accomplishment of the committee during the past year. At present, nineteen electric railways are gathering data on forms which were recommended by the committee last year. Each of these companies has purchased an instrument which for want of a better name is called the "Corrugraph." With these instruments they are now securing graphs of corrugation on selected sections of track.

Dimensions of some of the corrugation inspected by the committee on its trip during the summer of 1925 are presented in an appendix to the report. The wave lengths listed are irregular, ranging from 1½ to 10 in., lengths between 3 and 4 in. being the most common.

In the belief that the nature and magnitude of the forces or loads to which the rail is subjected have much to do with corrugation, a sub-committee on vibration was appointed. Preliminary tests made on track at Pittsburgh indicate a promising field for future work. More extended vibration tests and studies will be made during the coming year. Wave lengths for several different car speeds and frequencies of vibration have been computed and are shown in another appendix.

Obviously there is a close relation between track structure, vibrations and noise. Some tests of track noises made at Toledo by H. S. Williams of the committee on reduction of noise in car operation were witnessed by representatives of the corrugation committee.

These tests showed that the noise and therefore the magnitude and duration of track vibration may be radically different with different types of track structure. More specific data relative to these tests are presented in the report of the committee on noise reduction.

Figures of a number of hardness tests are presented in an appendix. Economic data relative to corrugation have been included in the same place.

Some consideration has been given by the committee to corrugation in other forms of engineering structures, particularly streets and highways. In these structures corrugation phenomena have come prominently to the attention of engineers only since the use of the automobile has become widespread. As with the electric railway, a radical change in the type of rolling stock brought with it troubles that were previously unknown. Because highway structures are ordinarily not so complex as railway track structures, and because the corrugations are larger and develop very rapidly, the difficulties in the way of studying them are not so great as in the case of steel rails.

W. W. Wysor
Chairman

Corrugation in highway structures seems to be limited largely to gravel roads and asphalt pavements, although it is sometimes found on tar-bound stone roads. In asphalt paving the displacement of the surface is ordinarily assumed to be due to shoving. This phenomenon was familiar to engineers before the advent of the automobile. To minimize shoving in modern pavements the tendency seems to be to use the harder grades of asphalt and a relatively lower percentage of asphalt than was used some years ago.

The bureau of public roads of the United States Department of Agriculture has made an extensive study over hundreds of miles of highways in many states. From its report it appears that corrugations do not form if the traffic is only 200 to 300 automobiles per day. With traffic above 400 automobiles per day, corrugations may give serious trouble, and where the rate of increase of traffic is well known, officials can predict almost to a day when corrugation will begin to develop.

Two methods of formation are described; first by the kick back of surface materials arising from the spin of one or both of the rear wheels of an automobile as they descend after a bounce over some obstacle or depression, and second, whenever the clay bond in a gravel road is sufficient in quantity and has sufficient moisture to give the aggregate plasticity, series of corrugation develop from the squeezing of the plastic mass. While rail steel and gravel mixed with clay binder are not similar, it is noted that the principle involved in the second cause given for gravel road corrugation has some bearing in the case of rail corrugation.

In conclusion, the report says that the whole problem of rail corrugation causes and elimination is a complex and difficult one and the committee believes that it will be necessary to spend some years in accumulating data and in study of different types of track and rolling stock construction before it will be possible to draw a definite conclusion as to the best manner of minimizing this trouble. In addition to the work of collecting data which is now under way, the committee believes that the work on rail, track and equipment vibration tests and studies should be carried on in an earnest and systematic manner, and that laboratory studies, including chemical, physical and photo-micrographic tests should be made on selected specimens of corrugated and non-corrugated sections of rail.

The report is signed by E. B. Entwisle, E. L. Lockman, R. B. Fehr, T. J. Lavan, C. R. Kinnear, H. Jackson Tippet, C. H. Clark, A. M. Hardini, C. L. Van Auken, H. Fort Flowers, J. Ormondroyd, H. S. Williams, D. D. Ewing and W. W. Wysor, chairman.

Equipment

EXISTING standards and specifications referring to equipment which are included in the Manual and in the 1924 and 1925 Supplements were reviewed and revisions and additions were recommended in the following items:

E1-25 — Design of Brake Shoes, Brake Shoe Heads, Brake Shoe Keys and Gages.

E2-25—Standard Journal Boxes and Contained Parts.

E12-25—Standard Gages for Journal Bearings and Wedges.

E3-25—Design of Axles for Electric Railway Motors.

E211-24—Rules for Inspection of Car Axles.

E103-25 — Specifications for Case-Hardened Forged Steel Gears.

E104-25—Specifications for Quenched and Tempered Forged Carbon Steel Gears.

E105-23—Specifications for Case-Hardened Forged Steel Pinions.

E106-23—Specifications for Quenched and Tempered Forged Carbon Steel Pinions.

E208-24—Miscellaneous Method and Practice on Lubrication of Car Equipment.

A progress report was presented on foundation and hand-brake rigging which included air-brake installation. Portions of the miscellaneous methods and practice designated as E212-25 were arranged as a recommended standard.

A progress report was included on car painting which included a study of cars painted by various methods. A large number of cars were inspected by the committee during the year, particularly at Detroit and Pittsburgh, and notes were made of the condition of cars after they had been in service for a period of years. The report gives conclusions reached by the committee from these studies, which were that all undercoating should be of the same general color as the finished coat in order that scratches or scrapes will not appear unsightly. This also makes the finishing coat cover more easily. All metal on cars when cleaned off for the application of new paint should have all rust removed so that new material will take a firm hold. Sand blasting was recommended as the best method of cleaning of material for the application of paint.

The color and varnish system was recommended for application to wooden interior finish of cars using spar varnish for window sash, window sills, arm rests and seats. Enamel and cellulose lacquer were recommended for application to the steel interior finish of cars such as seat framing, stanchions and wainscoting. The enamel system was recommended particularly for application to ceilings and head linings.

P. V. C. See
Chairman

The color and varnish system and enamel system were recommended for application to the body of wooden or wood and steel cars. The use of acid cleaners was considered inadvisable.

The three principal systems which include color and varnish, enamel and cellulose lacquer were recommended for application to the body of steel cars and a mixture of lead and oil or a long oil enamel was recommended for application to canvas roofs.

In connection with the study of motor coach design and maintenance methods, this year's committee was unable to hold any joint meetings with the Society of Automotive Engineers as that society had no meeting of its standing committee. A study was made of various maintenance inspection methods and a sample inspection system was included in the report. The committee recommended that the subject of developing a standard bus design be discontinued for the present, but that a committee work in conjunction with the standards committee of the Society of Automotive Engineers to take up for standardization of design, location or operation such items as operation of gear shift levers, location of hand brake, question as to whether hand brake should be pushed or pulled to operation, distance of foot pedals from driver's seat, location of starter buttons, relative position of spark and gas levers and the location of horn buttons.

The subject of gearing was again studied this year, but the work was limited to consideration of tooth forms and to providing limit of wear gages. These were given in the appendix of the report and the committee recommended that the gages for determining the scrapping point of gears and pinions be adopted as a recommended standard.

The committee took up with the boiler code committee of the American Society of Mechanical Engineers certain points in the boiler code which were felt to conflict with best electric railway practice. The secretary of the boiler code committee advised that certain matters wou'd be considered for revision. These include a lifting device for safety valves and the requirement of daily testing of safety valves.

A study of the standardization of car equipment and car construction with special reference to appearance, comfort and convenience of passengers, together with a study of car lighting, formed a large part of the report. The principal item was that of easy-riding cars. To produce this requires smooth track, properly designed springs, freedom of nosing and body jars. The importance of freedom from vibration may be appreciated when attention is called to tests conducted by the Bureau of Standards, which proved that vibration of an amplitude of 1,000th in. might be very uncomfortable to a passenger.

There is a tendency on the part of equipment engineers to specify a seat height of 17 in. and 17½ in., instead of the old standard of 19 in. This lower seat may have been influenced by the low automobile seats, but it is generally admitted that the lower seat is the more comfortable.

Seat spacing is also an item that requires attention, it being assumed that every one agrees that the maximum spacing possible will produce the greatest comfort. This spacing usually must conform to the body post centers. which on the standard car is 29¼ in. If thick seat backs and backs with greater incline than customary are used this will require greater allowance for seat spacing to produce equal comfort. It is possible that in this case as great a seat spacing as 31 in. will be necessary.

Under the classification of providing convenience for passengers perhaps the most important feature is car speed. The committee felt that no other single feature offers such great possibilities for popularization of service as this one.

Much has been accomplished to speed up the handling of passengers by the use of the door-operating treadle, particularly in one-man cars. This has permitted the use of a rear door which tends to keep the riders from crowding about the forward door. Also where conditions are favorable this door may be opened by a street fare-taker and passengers loaded through it.

Much confusion exists due to the use of front, center and rear-entrance cars. A standardization would correct this, though it is difficult of accomplishment.

Car signs should be given much study. Clearly, the signs should be of high visibility both day and night, and they should be sufficiently explicit to serve as a good guide. The route number is a very valuable adjunct to the sign system if properly worked out and is recommended for city service.

The committee suggests that the car painting scheme should be changed sufficiently to be noticeable to the public at least once every three years. The exterior of steel cars which are painted in light colors can be improved by the use of countersunk rivet heads.

Car interiors may be bettered as to appearance by the removal of unsightly bell cords where used on older cars and the substitution of electric signals.

The committee made a careful study of car lighting and conducted some tests, results of which were given in the appendix of the report.

The report was signed by W. S. Adams, W. C. Bolt, A. L. Broe, W. W. Brown, R. S. Bull, A. T. Clark, R. W. Cost, M. R. Hanna, J. M. Hipple, J. H. Lucas, W. H. McAloney, Joseph C. McCune, J. S. McWhirter, A. D. McWhorter, E. S. Sawtelle, R. B. Smyth, C. W. Squier, J. P. Staples, H. S. Williams, J. M. Yount, Daniel Durie, sponsor, and P. V. C. See, chairman.

American Engineering Standards

AT PRESENT, 32 projects, several of great importance, have been undertaken, according to the report of representatives on the main committee of the American Engineering Standards Committee. Revision of the National Electrical Safety Code is now under way by letter ballot. If accepted this should end the series of arguments and experience hearings on various often conflicting state rules on overhead construction. An electrical advisory committee has been organized. This has great promise, the report states, as a board of arbitration to adjust differences of opinion in the electrical field. The American Electric Railway Association has recognized the value of the work by taking out a second voting membership, R. H. Dalgleish filling this position. The association has been honored by having the main committee vice-chairmanship.

The report was signed by C. R. Harte and R. H. Dalgleish, representatives.

Heavy Electric Traction

OUTSTANDING in the work of this year's committee on heavy electric traction was the study of track and third rail bonds for heavy traction work. This is a new subject so far as this association is concerned. Four subjects were selected by the sub-committee for consideration, namely, a tabulation of present practice, the effect of heat of welded bonds on track rails, development of a standard basis for measurement of bond resistance and preparation of data covering results of tests of current-carrying capacity of bonds.

Information regarding current practice with track rail bonds was obtained from 25 roads, of which nineteen were electrified steam railroads and six were heavy electric lines. Of the 29 installations included nineteen were mechanically applied and the remaining ten heat applied. On third rail bonds thirteen companies, seven of which were electrified steam roads and six heavy electric lines, showed fifteen installations. Eight were mechanically applied and seven heat applied.

The mechanically applied bond is stated to be the oldest type in general use and hence the most widely adopted. It is used in sizes ranging from No. 0 A.W.G. to 500,000 circ.mil, and varying in length from 9 in. to 53.25 in. The pin-expanded terminal predominates, probably because this type can be installed and maintained very easily under traffic and without requiring the use of cumbersome or expensive tool equipment. The advantages claimed for the mechanically applied bond are summed up as follows: Easy to install; wide range in choice of length of bond and flexibility of design to suit rail joint; low labor cost of application and replacement; only small and inexpensive tool equipment required for installation. Its disadvantages are: High first cost; necessity of being designed to fit the rail joints, length being fixed by splice bar and bolt hole spacing; larger capacity than otherwise necessary when long lengths are required; uncertainty of securing and maintaining uniform and low contact resistance.

H. F. BROWN
Chairman

Heat applied bonds, particularly the welded type, have reached a successful stage of their development only within the past few years, with the consequence that this type is not as yet in sufficiently wide use under heavy traffic conditions to permit drawing definite conclusions as to its comparative merits. The sizes range from No. 0 A.W.G. to 250,000 circ.mil, while their length varies from 7 in. to 15.5 in. Gas weld bonds are being used in 70 per cent of the installations. Advantages claimed for the welded type of bonds are: Low resistance due to its short length and character of contact; use of small capacity bonds, all being 250,000 circ.mil or less; easily inspected; uniformity of design; permanence of contact and consequently permanence of contact resistance providing the weld holds. Its disadvantages are: Skilled operators are required for its installation; special and more or less cumbersome tool equipment is necessary; bond is exposed to mechanical injury and theft; limited to rail head application.

Comparatively little opportunity exists for standardization of third rail bonding because of the widely differing types of third rail construction.

Effects of heat in welding in changing the structure of rail were considered and references are given to earlier reports. It is hoped to continue the study during the next year.

The development of a standard basis for measurement of rail bond resistance was given attention. A comprehensive set of tables and charts giving resistances of rails with and without bonds is included. Field testing methods, by means of which the actual bond resistance may be obtained as a check on the calculations, or for purposes of ascertaining the excellence of bonds in service, are detailed.

Other subjects considered by the committee were the bibliography of heavy electric traction, branch line electrification and self-propelled cars, articulated train operation and revision of data on electric locomotives, multiple-unit cars and trains. Diagrams of recent articulated trains are given, and a comprehensive tabulation of electric locomotive and multiple-unit train data are included.

The report was signed by A. H. Armstrong, H. W. Cope, A. H. Daus, J. C. Davidson, J. H. Davis, J. V. B. Duer, J. T. Hamilton, E. C. Johnson, Norman Litchfield, J. O. Madison, M. W. Manz, L. S. Wells, A. H. Woollen, C. R. Harte, sponsor; Morris Buck, secretary; J. M. Bosenbury, vice-chairman, and H. F. Brown, chairman.

Noise Reduction

WORK of the committee on reduction of noise in car operation during this year was devoted largely to scientific study and analysis of some of the principal noise producing elements. The report states that it is necessary in order properly to study noises, to set up accurate comparative sound values, and to have a calibrated ear capable of placing a definite value upon sound, one which will register the same value on successive tests, and in which the personal or human equation is entirely eliminated. Acting upon the recommendations of the previous committee, the executive committee made an appropriation of $500 for the purpose of securing such an apparatus.

The practical use of the apparatus is to be able to demonstrate convincingly the relative value of changes made in elements of equipment to reduce the amount of sound generated. For example, it is desired to reduce the inherent noise in a car gear and the suggestion is made to bolt to the gear, pads of various materials to produce this result. In such a case an instrument of this character will tell the value of the proposed change in practice and will allow experimenters to arrive at the best material, shape and method of attachment. Such procedure is vastly better than trying to accomplish the same thing by the sense of hearing, because it has been shown that a man cannot always be depended upon to place the same value on noise; that fatigue, mental and physical condition, etc., influence his judgment and make it untrustworthy.

After considerable study, a device was decided upon which uses a type of transmitter similar to the familiar loud-speaker of radio reception connected through radio amplication equipment to a microammeter. Thus the noise gives a deflection of the needle which is almost directly proportional to the intensity of the sound. A device of this character was not available in the market as a unit, so it was necessary to have the apparatus constructed especially to meet the requirements encountered.

H. S. WILLIAMS
Chairman

The sound measuring mechanism employed by the committee represents only the first step in the contemplated noise study and attention is directed to the fact that the measurements give the proportionate amplitude of vibration of the noises analyzed. Items of pitch and effect upon the human ear are reserved for future consideration.

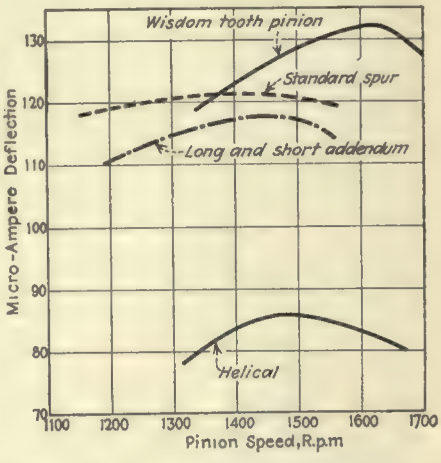
One of the chief sources of noise in car operation is that produced by the gearing. Attention was called in last year's report to the possibilities of noise reduction through higher standards of maintenance by keeping bearings well fitted, and renewing gearing before the teeth are worn to the breaking point and thus decreasing noise due to back-lash. It was one of the aims of the present investigation to prove this point by test, to place a definite comparative noise value upon the standard spur, long and short addendum spur, helical, and standard spur gear with the so-called wisdom tooth pinion and also to determine the value of silencing pads bolted to the gear. Gear noise in cars is combined with a multitude of other noises, one masking the other, so that it is difficult to measure the sound from the gearing on a car under operating conditions. However, it is entirely feasible to set up car gearing in such a way as to eliminate all sound except that produced by the gears and in this manner gearing may be subjected to experimentation and not only its condition as to noise determined but the value of proposed sound improvement evaluated. This committee with the co-operation of the Department of Street Railways of Detroit had the necessary mechanism set up to conduct tests on gears along the lines mentioned.

The first set of tests was run with the object of determining the comparative quietness of standard spur, long and short addendum spur, helical and wisdom tooth gears. Heretofore, this has been a vigorously debated question, but opinions have always been based upon personal opinion, which is never convincing. The committee felt that it would render a real service to the industry if it could settle this question. The necessary equipment is at the committee's command and it only remains to conduct check tests to dispose of this question finally. However, the care exercised in selection of gearing and running of tests was sufficiently painstaking and the results of the tests seem so conclusive that the committee feels warranted in reporting the results of their first experiment.

Briefly summarized, the helical gear shows up best in respect to quietness, followed in order by the long and short addendum spur, the standard spur tooth and the wisdom or drop tooth gearing. Accompanying curves show the results of several tests of gears of the various types taken under as nearly identical conditions as possible.

In order to arrive at as nearly accurate results as possible, gearing of the same manufacture and treatment were measured. These were furnished through the courtesy of the Cincinnati Tool Steel Gear & Pinion Company. Care was exercised to secure gears with accurately cut teeth and with minimum warpage and eccentricity.

In the first set of curves shown the micro-ampere readings are proportional to the volume of sound; that is, the higher the micro-ampere reading, the greater the sound. As the gearing was of the same number of teeth in each case, the pitch of the sound at each speed was approximately the same. Consequently the micro-ampere deflection is a true comparison.



Results of Tests on Gears of Various Types to Determine Relative Quietness—Gears Not Lubricated—Gears Operated on Pitch Line — 14.5 Hp. Transmitted

Attention is called to the character of the curves shown in that instead of increasing uniformly as the speed throughout the range of the tests they drop off at the higher speeds. This inconsistency may be due to the higher frequency vibrations being out of the efficient range of the amplification apparatus. At the time of submission of this report, calibration of the apparatus had not been made, so a definite reason could not be assigned.

GEARS TESTED WITH SILENCING PADS

Tests were run to determine the value of resilient pads bolted to the gears. The results of these experiments proved beyond doubt the value of a silencing pad. To complete this phase of the work it will be necessary to try out various sizes, shapes and compositions of the cushioning pads.

To show the possibilities of reduction of noise by applying a cushioning medium to the rail in track construction, a series of tests were made by the use of the apparatus previously mentioned. Through the courtesy of P. J. O'Neill, railway engineer Community Traction Company, Toledo, Ohio, means were made available to conduct the test. Two sections of adjoining track were selected in which the structure is nearly identical except that a cushion about the rail is used in one case and not in the other. The tests were conducted between the hours of 1 and 2 a.m. to insure freedom from interfering street noise and to permit the special car which was used to move as desired. In making the tests the car was run at a uniform speed and coasted past the sound pick-up device so as to eliminate as far as possible the noise from the gearing. The results of several tests on each section of track show that the cushioned track is approximately 25 per cent quieter than the same track without the cushion.

ECONOMIC SIDE OF NOISE REDUCTION

The necessity for noise reduction extends further than a question of an unpleasant sensation which it is desirable to eliminate in order to make street car rides more salable and to reduce the complaints of residents, although that is the chief consideration which actuates the present movement. There is the economic side which is very important, for noise is occasioned by vibration of the physical structure and that vibration means a destructive force which ultimately will cause a breakdown.

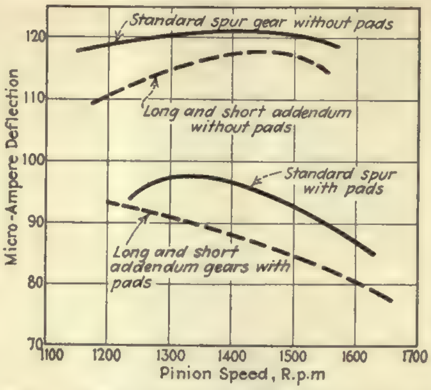
The committee found that the sources of noise in the order of their importance are:

1. Wheel and track vibration caused by wheel impact.
2. Gearing and motor noise due to gear tooth impact.
3. Noise of loose parts which are secondary vibrations due principally to the transmission of wheel impact vibration.

The remedies recommended in principle are:

1. Higher standards of maintenance.
2. Improved design, including cushioning and reduction of unsprung weight.

Much has been written relative to higher maintenance standards and the committee emphasizes this and the importance of discarding gearing with badly worn teeth. The equipment committee this year has recommended a gear discard gage which will do much to help this condition. Bearings should be tightly fitted and renewed before the wear becomes great. Individual fitting of axle bearings is strongly recommended.



Noise Comparison of Standard Spur and Long and Short Addendum Gears with and without Cushion Pads

In design, attention is called to the principle that any loose part or any part not rigidly supported will vibrate so it becomes necessary to cushion these parts, or brace them rigidly or to isolate the elemental parts by cushions. In some cases vibration may be reduced by so changing parts that their natural vibration periods will be materially different from the frequencies set up by wheel impact or gear vibration. It is possible also in the case of elliptic springs to break up synchronous vibration by throwing the spring seat off the center of the spring, thus making unequal ends.

Brake shoes are prolific sources of noise and there is great need for improvement of this item.

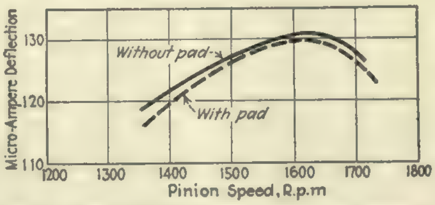
Where possible, gear ratios may be so designed as to give pleasing vibrations rather than the reverse. For example the following gear and pinion ratios combine to form harmonious musical pitches:

Ratio 5:6 produces a minor third.
Ratio 4:5 produces a major third.
Ratio 2:3 produces a perfect fifth.
Ratio 2:1 produces an octave.

Gear cases may become sounding boards due to their large flat surfaces unless means are used to overcome this tendency.

In conclusion the report states that to conquer the noise condition in car operation or at least to bring it to the irreducible minimum, further study, research and analysis will be necessary.

It may be argued that if a noise cannot be reduced sufficiently to detect it or to determine its value by ear its elimination should not be attempted and that scientific study such as is being attempted by this committee is impractical.



Noise Comparison of Wisdom-Tooth Pinion and Standard Spur Gear with and without Pads

Such a contention cannot be well supported, because the ear is too unreliable as a sound measurer, and the ear method is susceptible to too much personal element and is inconclusive. Then, too, this noise problem is composed of so many small elements whose summation makes a disagreeable condition. Neglecting bad maintenance noises which are apparent and need no expert diagnosis, the problem is to cut the sound of all the possible noise-producing elements—a little here, and a little there—and the aggregate will amount to a real accomplishment. The problem is comparable to that of reduction of weight in car design. If it is desired to reduce the weight of a car, say, 5,000 lb. it is patent that this weight cannot be taken out of any one item, but if a little is taken from the wheels and axles, a little from the motors, etc., the sum total will mean a substantial weight reduction. Therefore the committee feels that it is on the right track and that measurement, analysis and experimentation will bring success.

The report is signed by W. S. Adams, H. E. Bean, E. H. Berry, C. Bethel, W. W. Brown, L. J. Davis, M. Guynes, F. L. Hinman, G. H. McKelway and H. S. Williams, chairman.

Wheel-Flange Gages

THE duty of providing necessary wheel gages had previously been assigned to the equipment committee with instructions to co-operate with the way committee. At present the association has standards for a wheel mounting gage and limit of wear gages for the steel wheel contours designated as A, B, C and D. There is no wheel checking gage for these flange contours, however, and no gages have been provided for the two American Railway Association's contours, which were adopted as standards of the American Electric Railway Engineering Association in 1923 and which are shown at present on page 499 of the Manual.

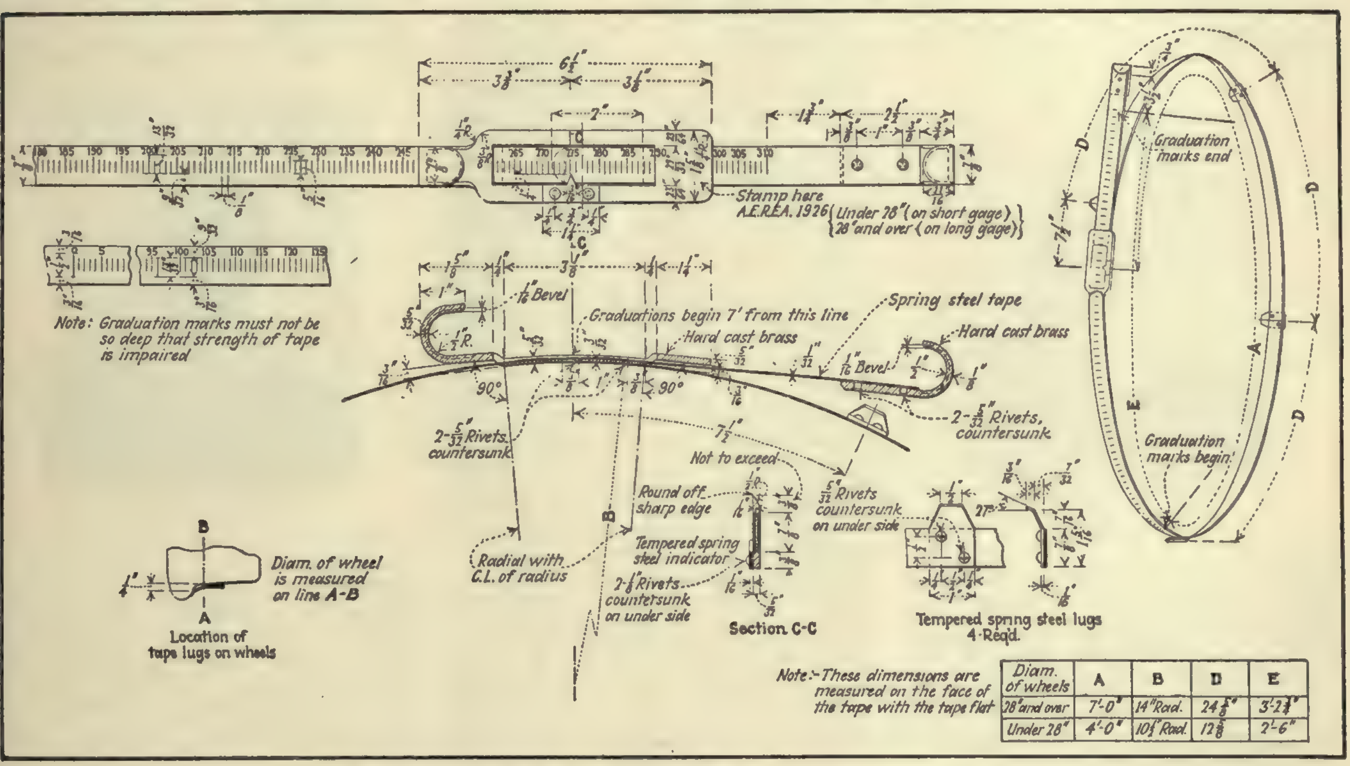
DESIGNATING LETTERS ON DRAWINGS DESIRABLE

In making up the drawings of various gages for wheel flange contours the committee found it of particular convenience to have designating letters for each of the wheel contours. At present the letters A, B, C and D, together with various numerical suffixes, are used to designate the association's standard tread and flange contours for steel and chilled iron wheels. The two A.R.A. wheel contours which were adopted as standards of the American Electric Railway Engineering Association in 1923 and which appear on page 499 of the Manual have no designating letters.

To provide designating letters for these two latter contours the committee recommended that the letters E and F be assigned to them; that contour E be used for the contour of chilled iron wheels as standardized by the American Railway Association in 1909 and as adopted by the American Electric Railway Engineering Association in 1923, and that letter F be used to designate the contour for steel and steel-tired wheels as standardized by the American Railway Association in 1920 and as adopted by the American Electric Railway Engineering Association in 1923.

New Gage for Wheel Mounting

At present the association has a standard wheel mounting gage for steel and chilled iron wheels which appears on page 122 of the 1925 supplement to the Engineering Manual. This design of gage is for mounting wheels with contours A-3, A-3½, B-2½, B-3, C-2½, C-3, D-2½ and D-3 only. There is no wheel mounting gage for the two A.R.A. contours which the committee designated as contours E and F. To provide a wheel mounting gage for these contours the committee recommended the adoption of a new gage. This gage is the same as the standard A.R.A. mounting and check gage as shown in section B, page 42 of the A.R.A. Manual (Mechanical Section) except that the gage is provided with a center point similar to that used in the A.E.R.E.A. standard wheel mounting gage.


6½"
3⅛"
3⅛"
2"
1/4" R.
3/8" R.
1/16" R.
1/8"
5/16"
11/32"
1/4"
1¼"
C
1¾"
2½"
3/8"
1"
3/8"
3/4"
7/8"
11/16"
180 185 190 195 200 205 210 215 220 225 230 235 240 245
265 270 275 280 285 290
300 305 310
0 5
95 100 105 110 115 120 125
Stamp here
A.E.R.E.A. 1926 {Under 28" (on short gage) / 28" and over (on long gage)}
Note: Graduation marks must not be so deep that strength of tape is impaired
1⅝"
1/4"
3⅛"
1/4"
1¼"
1"
1/16" Bevel
Graduations begin 7' from this line
Hard cast brass
Spring steel tape
Hard cast brass
5/32"
1/2" R.
3/16"
90°
1/8"
1"
3/8"
90°
3/16"
1/32"
1/16" Bevel
1/2"
1/8"
2-5/32" Rivets, countersunk
2-5/32" Rivets, countersunk
7½"
Not to exceed
Round off sharp edge
5/32" Rivets countersunk on under side
Radial with C.L. of radius
Tempered spring steel indicator
2-1/8" Rivets countersunk on under side
Section C-C
Tempered spring steel lugs 4-Req'd.
27°
B
A
1/4"
Diam. of wheel is measured on line A-B
Location of tape lugs on wheels
Graduation marks end
Graduation marks begin
D
D
D
A
E
7½"
3/4"
Note:-These dimensions are measured on the face of the tape with the tape flat

Diam. of wheels	A	B	D	E
28" and over	7'-0"	14" Rad.	24⅝"	3'-2¾"
Under 28"	4'-0"	10½" Rad.	12⅜	2'-6"

Wheel Circumference Measuring Tape for Contours A, B, C and D

This gage is also to be used as a check gage for wheel contours E and F.

The 1925 equipment committee attempted to develop a wheel checking gage that would apply to all wheel contours, but it was found necessary to refer the proposed design back for further revision. The committee this year, therefore, considered this subject and decided to resubmit the gage proposed by the 1925 equipment committee and which appears on page 291 of the 1925 Engineering Proceedings, with all references to contours E and F omitted and with the thickness of the material specified as ⅜-in. spring steel.

The committee considered the subject of limit of wear gages and recommended that the present standard limit of wear gages for the American Electric Railway Engineering Association as adopted in 1916 and revised in 1923 and 1925, and which appear in the 1925 supplement to the Engineering Manual on pages 118 and 119 have the following additions to the captions for Figs. 1 and 2 which appear on page 118:

"Gages as shown are for use with rolled steel wheels only. The same general dimensions apply to gages for use with cast-iron wheels except that the part which projects down the back of the wheel should be cut off in line with the tread face."

The committee also considered it desirable to provide limit of wear gages for determining high and low flanges and such a gage was presented.

The committee considered it desirable to provide standard tapes for measuring the circumference of wheels. The American Railway Association has such a tape which was adopted in 1893 and modified in 1919. This tape was recommended to be used for the two A.R.A. wheel contours which were adopted as standards of the American Electric Railway Engineering Association in 1923 and which appear on page 499 of the Manual.

The committee also considered it desirable to provide a new standard circumference measuring tape for steel and chilled iron wheels with contours A, B, C and D. Investigation showed that such a tape has been in use for a number of years by the various steel companies who manufacture rolled steel wheels to these contours.

The committee recommended that the wheel circumference measuring tape for standard tread and flange contours A, B, C and D of steel and chilled iron wheels, as shown in Fig. 2, be adopted as a recommended standard.

The report was signed by W. S. Adams, C. A. Alden, W. C. Bolt, J. H. Haylow, Hugh Savage and C. W. Squier, chairman.

Co-operation with Department of Commerce

STANDARDIZATION of sizes and simplification of specifications for many articles used by electric railways were considered by the committee appointed to co-operate with the United States Department of Commerce. Approval was given to the recommendation for simplification of grinding wheels. A change was approved in the sizes of tacks so that their lengths should vary by ⅛ in. instead of by 1/16 in. The subject of simplification of glass sidewalks and roof lights was carefully considered and it developed that the present practice of manufacturing this material is in accordance with the recommendation of the Department of Commerce.

Specifications covering iron and steel scrap for use by blast furnaces, steel plants, foundries, etc., were approved. At the same time, the contract for the purchase of scrap was submitted. The committee felt that this was a contract prepared by the purchasers of the material and did not indorse it.

Other subjects considered by the committee included: simplification of self-opening die heads, new billet steel bars for reinforcing concrete, simplification of sizes of steel reinforcing bars, advisability of showing weights of castings on blue prints, simplification of carbon brushes, simplification of wrought iron and wrought steel, pipe, valves and fittings and simplification of shovels, spades and scoops.

Attention is called to the work now being done by the Department of Commerce in the Simplified Practice Division. The association is represented at the conferences and is endeavoring to take care of the interest of its members. In all cases, the recommendations are approved for one year, and at the end of the year changes may be made in the recommendation if there is sufficient demand. If members of the association find difficulty in securing the proper material due to the recommendations of the Department of Commerce, notification should be sent to the executive secretary of the association in order that the committee may be able to correct any difficulties. It is possible that in the case of simplification the practice might be carried too far for satisfactory results, and in such cases, the committee would be glad to take up the matter and have the objectionable features eliminated.

The report is signed by R. H. Dalgleish, chairman.

Engineering Symbols

ALL of the material which had been prepared and partially completed by the committee of the preceding year was reviewed by this year's committee. To keep the cost of the report within reasonable limits, as well as to concentrate the efforts of the committee on types of symbols most generally used by electric railways the work was limited to the following classifications: Topographical, electrical equipment of buildings, miscellaneous electrical, railroad, and railroad signal symbols. Drawings were made and cuts prepared of all the symbols which the committee felt should be included in the report.

H. W. CODDING
Chairman

During the year the subject of symbols for engineering and mathematical work has received active attention from a number of different organizations. With this in mind, the committee felt that it should confine its activities to those subjects most intimately connected with electric railways in order to complete a report that would include symbols most essential for electric railways to have considered in any general standardization work. Symbols concerning architecture, heating and ventilating, mathematics and mechanics were considered but were omitted, as other organizations are better equipped to formulate them. Some additional power distribution symbols were considered, but as there was no general agreement in the symbols studied they have been omitted.

The chairman of the committee, as a representative of the American Electric Railway Engineering Association, attended a conference called by the American Engineering Standards Committee on drawings and drafting room practices and also attended the organization meeting of the sub-committee on electrotechnical symbols and abbreviations, including radio, of the A.E.S.C. sectional committee on scientific and engineering symbols and abbreviations. This sectional committee has now undertaken the standardization of symbols, but as the work of the sectional committee will, by virtue of its organization, move slowly, the committee decided to complete its report.

The symbols submitted are classified as follows: Topographical, Figs. 1, 2 and 3; electrical equipment of buildings, Figs. 4 and 5; miscellaneous electrical, Figs. 6, 7 and 8; railroad, Figs. 9 to 18 inclusive; railroad signals, Figs. 19 to 31 inclusive.

Where possible, topographical symbols should be printed in the colors given with the symbols.

The symbols for batteries and instruments included with railroad signals (Figs. 19 to 28 inclusive and Fig. 31) are of the same general form as shown under miscellaneous electrical symbols, but vary in minor details in order to keep them the same as those adopted by the signal section of the American Railway Association. The symbols for transformers, reactors and resistors (Figs. 29 and 30), however, are identical in both groups submitted. These differ from the corresponding symbols of the signal section of the American Railway Association, which conflict with those generally used in most branches of the electrical industry.

Since a sectional committee of the American Engineering Standards Committee has now undertaken general standardization of symbols and as their work will be connected closely with the attempt of the International Electrotechnical Commission to prepare international standards, the symbols submitted in this report will be of assistance in having symbols acceptable to the electric railway industry considered by the sectional committee. In the period intervening before the A.E.S.C. can adopt standards, these symbols should be of particular value to electric railways. The committee recommended (1) that the symbols submitted in this report be adopted as a recommended standard; (2) that the committee be continued to co-operate with the sectional committee of the American Engineering Standards Committee.

The report was signed by M. M. Johnston, J. D. Kent, G. H. McKelway, W. F. Graves, sponsor; C. W. Squier, vice-chairman, and H. W. Codding, chairman.

Review of Engineering Manual

WORK of way and structures special committee No. 1 on review of buildings and structures and way sections of the Engineering Manual consisted largely of carrying forward the recommendations of last year's committee and studying various suggestions submitted. A few minor changes in the Engineering Manual were recommended. The report was signed by T. H. David, D. J. Graham, J. S. Mahan, D. H. Walker and W. R. Dunham, Jr., chairman.

Unification of Car Design

THE question of car design was considered in a joint session with the committee on essential features of modern cars, appointed by the president of the American Electric Railway Association. Designs were prepared covering proposed city type, double-end and single-end cars; also, double-end and single-end interurban cars. After detailed consideration, the committee found that the designs of the city type of car corresponded with the recommendations made in previous reports. Consequently, it approved the proposed designs. The question of limiting stresses to be used in the design of cars of these types was considered and the following is recommended:

1. The car body should be designed to carry under service conditions the maximum live load for which it is intended in addition to its own dead weight.

2. The direct stress in the body bolsters, platform arms, and side frame girder, due to maximum static load, must not exceed 12,000 lb. per square inch of either tension or compression.

H. H. ADAMS
Chairman

3. The combined stress in the body bolster, due to carried load plus the stress due to the tractive pull of the truck and application of the brakes, must not exceed 16,000 lb.

4. All connections should be designed for the maximum load to which the member connected may be subject. The secondary stresses in any members caused by eccentric loads should be combined with the direct stresses in such members. The fiber stresses (except in body bolster, referred to in paragraph 3) may be taken at 20 per cent greater than those given in paragraph 2, but the direct stresses, considered alone, must not exceed the 12,000 lb. above stated.

5. The report of the committee on unification of car design of 1922, Fig. 2, gives the typical stress analysis of a car body. Proper provision must be made in the side girder to prevent buckling over the bolster.

6. The permissible stresses above given are predicted on steel having the characteristics called for in A.S.T.M. specification No. A-11-24, Structural Steel for Cars. Where other materials are used, they should bear the same proportion to the ultimate strength of material used.

It was recommended that the committee be continued to act in the same capacity for another year.

The report was signed by C. A. Alden, J. A. Brooks, L. J. Davis, H. F. Flowers, C. Gordon, J. A. Greig, J. W. Hulme, A. P. Jenks, G. L. Kippenberger, J. Lindall, Victor Willoughby, W. F. Graves, sponsor, and H. H. Adams, chairman.

Stores Accounting

ENLARGEMENT of the present classification of materials and supplies to include a classification of bus material was recommended in the joint report of the committee on purchases and stores of the Engineering Association and the committee on stores and accounting of the Accountants' Association.

It was pointed out that whereas certain companies operating buses were carrying stocks of considerable size, while other companies were able to operate without any stock, being able to make satisfactory arrangements with local dealers for immediate deliveries of required parts, the proposed classification was not only well constructed but, in the opinion of the committee, covered present and future needs.

P. F. McCall
Chairman

Methods for handling freight and express bills were recommended following a detailed study of this subject made by means of questionnaires sent to 25 representative electric railways. The subject of co-ordination of materials and supplies with the operating budget was also considered by the committee.

Regarding the disposal of unused inactive material, the committee had prepared a questionnaire dealing with the desirability of establishing a clearing house for such material and containing a number of alternative propositions for carrying out this plan. These questionnaires had been submitted to company members and it was hoped to have the replies tabulated and analyzed in time for presentation at the October meeting.

The following subjects were recommended for consideration by the committee on purchases and stores for 1927:

1. Study and make recommendations regarding the disposal of unused inactive material.
2. Make a further study of routine methods to be followed in the purchasing and stores departments, recommending that report be made on uniform method of distributing materials by supply trains or trucks.
3. Recommend that a uniform practice of testing or inspecting material by testing or inspecting materials on receipt or at factory be adopted.

The report was signed by the following:

For the Engineering Association—J. Y. Bayliss, A. S. Duncan, J. Fleming, B. W. Forkner, C. A. Harris, A. E. Hatton, F. A. Jordan, A. A. Ordway, C. W. Stocks, C. Thorburn, W. J. Walker, R. H. Dalgleish, sponsor; F. L. Wheaton, secretary, and P. F. McCall, co-chairman.

For the Accountants' Association—G. H. Caskey, W. S. Stackpole, F. E. Wilkin and R. A. Weston, co-chairman.

Power Generation and Conversion

EXISTING Manual sections were gone over to determine revisions desirable. In the section containing specifications and contract for the purchase of fuel the committee recommended further study. Since the prime movers committee of the National Electric Light Association has not been active on this subject during the past year the committee was unable to make desired progress.

In regard to specification for high-tensile strength bolts for use on superheated steam pipe lines, which was submitted at the 1925 convention, the committee found that a proposed specification on this subject, as drawn by the American Society for Testing Materials, was accepted as a recommended standard by the American Electric Railway Association. This specification has since undergone a slight revision and has been accepted by the American Society for Testing Materials as a recommended standard, subject to the outcome of a letter ballot. The committee recommended that no further action be taken regarding the acceptance of this specification at this time.

The application of various types of equipment to automatic substations and the subject of remote supervisory control have been rather thoroughly covered in past reports of the association. Efforts of this year's committee were concentrated upon the compilation of data pertaining to operating phases of this type of station, including consideration of the cost of operation and maintenance. For the purpose of collecting information questionnaires were sent out. Replies were received from 44 companies which have a total capacity of 745,955 kw. of conversion equipment, practically all of which is in the form of synchronous converters. The information received was analyzed and tabulated to show the distribution of equipment as divided between manually operated, full automatic and semi-automatic apparatus, also a classification of converters according to service. A number of questions were included relative to the frequency of inspection, type of men used, methods devoted to inspection and maintenance cost. Further tables were compiled to show inspection practice used and comparative cost of inspection and maintenance labor.

The committee attempted to determine the extent to which supervisory control or some form of distant indication is being used. Companies operating approximately one-third of all automatic equipment employ supervisory control either for all or part of their equipment. Seven companies rely on lamp signals near the tracks and four companies on lamp signals in adjacent manual stations. Nineteen companies provide no special indication of any sort in case of a lockout, depending presumably upon reports of low voltage.

Regardless of the method used, it appears from the report that it is advisable to provide some means for prompt notification in case of station trouble. A station may lock out during a time of light load and if voltage indications alone are depended upon the trouble will not be remedied and service may be seriously affected when the heavy load comes on. If supervisory control is not warranted some simple and inexpensive means can usually be found for providing definite indications at the time of the trouble.

Lawrence D. Bale
Chairman

A study was made of the application, characteristics and present status of the mercury arc power rectifier for electric railway service. The report included a discussion of the characteristics and application of the mercury arc power rectifier compared with the synchronous converter. The matters of efficiency, power factor, regulation, operation, maintenance, building requirements and cost were included. Due to the limited experience with the rectifier in this country most of the data obtained were from foreign sources.

Difficulty was experienced by the committee in comparing the application or the rectifier with the synchronous converter on account of the inherently different characteristics of the two types of equipment, with particular reference to sustained overload capacities. This was partially overcome by limiting the considerations as to applications to two general classes of systems, as referred to in the report, having widely different characteristics regarding momentary and average load demands.

The availability of American standards of rating for the rectifier compared with those of the present A.I.E.E. standards for the synchronous converter is, without question, of great importance, particularly at this time in view of the advent of the rectifier in the American field. The committee considers that steps should be taken to bring the necessity of American standards for the mercury arc power rectifier to the attention of the proper engineering standards body, and to that end it recommended that the study be continued.

A large part of the report related to information obtained through a study of ventilation and reduction of noise in the operation of automatic substations. The information tabulated brings to a conclusion a series of studies which has extended over a period of four years; these studies were reported on in 1924 and 1925. The activities of the committee for the past two years have been centered on obtaining data in regard to the subject of ventilation. This was collected from tests made by the committee on representative automatic substations in actual operation.

The conclusions of the committee were that heat dissipation by means other than ventilation is of sufficient magnitude to affect the dissipation required of the ventilating air. For an ordinary substation building having 13 in. exposed brick walls, 6 in. concrete floor and 4 in. cinder concrete roof with weatherproofing it averages $\frac{2}{10}$ watt per square foot per degree Centigrade difference in indoor and outdoor temperatures, but considerably less for thicker walls and for soundproof building construction. Wind and rain will temporarily raise dissipation by means other than ventilation in isolated buildings.

Rotating machines have well-defined suction and discharge areas. Air is drawn into the revolving element along its shaft, overbearings, commutators, collector rings, etc., and is discharged from the largest cylindrical surface, through or over the edge of the stationary element or both, the performance being similar to that of a fan with concentric housing and sides removed. The intensity and extent of these suction and discharge areas are such that the machine will circulate a sufficient amount of air to dissipate the losses at full-rated load with from 4 deg. C. to 7 deg. C. rise, 7.2 deg. F. to 12.6 deg. F., corresponding to from 475 to 270 c.f.m. It follows that if recirculation of the heated air is prevented no overheating will result either of the machines themselves or of the room air.

Recirculation can be almost entirely eliminated and natural or self-ventilation relied upon to dissipate the losses in installations of greater concentration in kilowatts of rated capacity per square foot of floor area or cubic foot of building space that now appears to be general practice for automatic substations in railway service.

The following arrangement of inlets and outlets appears to be quite effective in supplying proper ventilation for automatic substations where it is permissible to locate openings of sufficient areas in the walls of the structure at will. This arrangement is also suggested as a means of preventing recirculation of ventilating air to the greatest extent:

(a) Locating inlets just above the floor level, but within the effective range of the machine suction, not more than 5 ft. from the ends of the machine. All inlets should be on same elevation.

(b) Connecting inlets to floor openings at the pedestal ends of the machines. These openings can in most cases be extended a short distance inside the base casting.

(c) Providing hoods over the floor openings at the ends of the machines to guide the air directly into the suction areas.

For outgoing heated air:

(m) Confining the downward heated air discharge to an inner pit, extended on that side of the machine toward which the lower part of the armature revolves, to a floor opening or outdoors.

(n) Locating outlets in the pressure zone of the station so as to take advantage of the pressure created by the machine in ejecting the air.

(o) Providing a volute housing over the discharge area to collect the heated air and ducts to conduct it outdoors.

(p) Aggregate air inlet areas should at least equal the aggregate outlet areas and preferably should be 1½ to two times as large.

Means of forced ventilation need only be resorted to in cases where additional resistance against the natural flow of air is introduced, such as air filters or washers, soundproof building construction, or as insurance against shutdowns from overheated apparatus other than rotating machines.

Where insurance against overheating arising from unfavorable size and location of building or the restriction of free air flow by adjacent buildings, as well as liability to prolong overload during extremely hot weather, forced ventilation has been employed with effective results.

So far as effective cooling of the machines is concerned exhausters or blowers appear to serve the purpose equally well, but the room temperature becomes more comfortable if the heated air is exhausted than if the cool air is forced in, presumably because in the latter case more cool air bypasses the machine directly to the outlet and a greater quantity of cooler air is discharged to the atmosphere, leaving the room warm. With the exhauster an equal quantity of warmer air can be discharged, leaving the room at a more comfortable temperature.

As in the case of natural ventilation, it is essential for effective cooling that recirculation be avoided and the same means can be employed to avoid it.

The report was signed by C. E. Bennett, C. A. Butcher, H. W. Codding, H. A. Kidder, N. R. Love, F. W. Peters, G. W. Saathoff, L. J. Turley, G. I. Wright, E. H. Scofield, sponsor; W. E. Bryan, vice-chairman, and L. D. Bale, chairman.

Power Transmission and Distribution

EXISTING Manual sections were reviewed and recommendations for revisions were made in certain ones. Others cover specifications which are now being actively studied by sectional committees of the American Engineering Standards Committee, and while there is some need for revision of existing Manual sections, it was recommended that these be withheld until the A.E.S.C. has taken final action.

The committee prepared specifications for a number of items of material used in catenary construction and recommended that these be included in Manual Section "D." These included pole bracket arm assembly, messenger insulator pin, messenger insulator, catenary hangers, cross-span steady, pole-bracket steady, catenary messenger anchor clamp, trolley splicer, flexible pullover, feeder connector, catenary trolley sectional insulators and trolley frog and crossovers. It was recommended that the specifications covering material for catenary construction as presented be adopted as a supplement to the specifications for overhead line material for 750-volt direct-current suspension, serial designation D102-21.

The committee carried on studies of trolley wire breaks and submitted an analysis of results obtained by companies which have co-operated in these tests. The recommendation of the committee was that these studies be carried on by next year's committee.

Arrangements have been made with a number of railway companies to install test sections of trolley wire in order to determine the relation of life of trolley wire to the number of twists it will stand under test. These tests will require several years to complete and next year's committee should keep in touch with them.

A number of minor modifications were made in the specification for hard-drawn copper trolley wire. This specification was originally prepared in conjunction with the American Society for Testing Materials. The committee recommended that the work in conjunction with the American Society for Testing Materials be continued in an endeavor to bring the high-strength, low-conductivity trolley wire specifications of the two associations into complete conformity.

No work was done by this year's committee in regard to inductive coordination, except to keep in touch with the American committee on this subject. The recommendations of the committee were that this subject be continued next year and that the American Electric Railway Engineering Association be ready to furnish information that the American committee may desire.

The committee continued its study of interference to radio reception caused by the presence of electric railway facilities. Tests and experiments were made further to determine the nature of the interference to radio reception and the various sources from which such interference may emanate. The report included a series of tests conducted at Lafayette, Ind., and another made in New York City. From the tests and study made by the committee regarding this subject, it appeared that trolley car operation may be responsible for interference to radio reception for a distance up to 200 ft. or even more from the trolley cars, wires and feeders. The distance at which interference may become a detriment to radio reception depends to quite an extent upon the receiving set used and the location of the set with respect to broadcasting stations. Thus, sets which are being operated in cities where there are a number of good-sized broadcasting stations and where the sets are being operated at a rather low degree of amplification may not be bothered by trolley car interference where such sets are located 50 ft. or more from trolley lines.

On the other hand, sets which are being operated at a considerable distance from broadcasting stations and where the degree of amplification is large in order to get loud speaker reception from a distant station may experience serious interference where such sets are located 200 ft. or possibly more from a trolley line.

Interference originating on a trolley line may be transferred to parallel lines, such as light and power lines, telephone or telegraph lines, and be distributed by them, thereby causing interference to receivers located at remote points from the trolley line. Trolley lines may also pick up interference originating at sources foreign to the trolley line and distribute it, thereby causing interference for which the trolley lines may be blamed, but for which they cannot, in any way, be held responsible.

Considerable unnecessary interference may be eliminated on trolley lines by the simple expedient of locating the sources and correcting the trouble. Much of the interference is of such a nature that it probably cannot be eliminated, although it may, to some extent, be lessened by methods as suggested in the report.

A review was made of specifications for 600-volt direct-current overhead trolley suspension and it was found that certain changes were desirable. These were included in the committee's report with the recommendation that actual revision of the existing Manual section be deferred until the American Engineering Standards Committee has completed its work on the national safety code in connection with line material specifications. After this has been accomplished it was the opinion of the committee that the specifications might require further revision.

A code of principles to be followed in drawing up joint pole use agreement was submitted. This includes sections on advantages of joint use of poles, disadvantages of joint ownership of poles, principles of joint use, and practices of joint use. The report also included an appendix with suggestions for desirable changes in the specifications for direct suspension trolley construction, the idea being to incorporate these for use of future committees.

The report was signed by J. W. Allen, S. H. Anderson, W. H. Bassett, M. W. Cooke, J. H. Drew, D. D. Ewing, C. L. Hancock, C. J. Hixson, A. J. Klatte, H. S. Murphy, J. F. Neild, W. J. Quinn, W. Schaake, A. Schlessinger, George F. Wennagel, M. B. Rosevear, sponsor; F. McVittie, vice-chairman, and Charles H. Jones, chairman.

Economics of Automatic Substations

THERE were two points developed in connection with automatic substation application during the past two years which influenced the nature of this report so that it might be of practical value to the railway engineer.

First, the economies and other advantages of the automatic substation have been proved in practice in a sufficiently large number of cases to make the desirability of this type station a fact accepted by nearly all railway engineers. During the past two years almost all new substations (approximately 80 per cent) installed for railway companies have been automatic. When manual substation equipment was installed there was usually some peculiar condition that made its use seem desirable.

Second, it is advisable to make the study immediately on the somewhat laborious but more accurate "cut and try" method. The principal difference between the "cut and try" and the "analytical" methods is that in the former the layout of the changes in the distribution system must be prepared before estimating the costs. But it has been found the feeder layout has a larger influence on the economics of the problem than had been expected. Also the study of the proposed feeder layout is very helpful in arriving at the final conclusion.

It seems now to be the general consensus of opinion that the automatic railway substation should be used for new installations in practically all cases and in many cases manual stations should be replaced by this type. Its advantages are as follows: Economic savings will result. The service will be as reliable or more reliable. Service will be restored quicker after high-tension interruptions and with less chance of error.

The committee concludes that any engineer or management contemplating additional substation equipment should decide at once that the new station would probably be automatic, unless some unusual condition was involved. In many cases, it should even pay to remove converters from existing manual stations and install them in new locations as automatic substations, provided the converters are of a sufficiently modern type.

The electrical engineer can choose the size of automatic substation which from his experience he feels might best suit the portion of the system under consideration for use in determining its economics compared with a manual station layout. Judging from past practice, there will be very few cases where larger than 2,000-kw. synchronous converters will be used for automatic substations for surface operation. The engineer will then know that the estimated costs obtained will be slightly less for a larger size converter or slightly more for a smaller size converter.

The report then reviews the "cut and try" method, referring to the detailed instructions contained in the 1922 report of the special committee on automatic substations. A review of the past committee reports is also given fully, with comments and data from installations recently made.

E. H. Scofield developed an analytical method of determining substation layout based on general assumptions that would give the comparative annual cost for any desired number of automatic substations planned. This analytical method for estimating the economical number of automatic substations was contained in the 1923 Proceedings. Ralph H. Rice of the Board of Supervising Engineers of Chicago suggested at that time that it should be possible to present the analytical method in the form of a formula and in the following two years proceeded to work out such a formula. The committee considers that this is an interesting and valuable contribution to the subject and submits this formula, with its complete mathematical derivation, in the report for 1926.

The committee further states: "In view of the fact that this formula has not been applied to a specific problem, little can be said one way or the other commenting on its practicability for solving automatic substation studies." In general, the same comment would apply to the "analytical" method, as noted in the 1923 Proceedings. This formula, like the analytical method, is intended merely as a preliminary study, but is probably superior to the analytical method. It should give an approximation of the most economical number of stations for any area and can be solved for an approximate cost.

There are seven appendices to this report, five of which develop mathematically five of the variables in the working formula referred to above. Appendix F is a mathematical determination of the average feeding distance for any number of substations and Appendix G gives definitions of the terms "load factor" and "line loss factor" as used in the calculations.

In conclusion, the report states that the automatic substation has been proved and accepted as the most economical and advantageous way of converting and distributing energy for street railway systems, both urban and interurban. With the summary contained in this report and the information of the preceding report of the special committees on automatic substations the method of determining the most economical substation plan and estimating its cost has been described in sufficient detail so that any railway engineer can apply the solutions to his own particular problems.

Future developments in this field can be properly and logically followed for the two standing committees on power generation and conversion and on power transmission and distribution.

For this reason this committee recommends that the special committee on automatic substations be discontinued and the problem of determining the proper design of the distribution and layout for automatic substations be referred to the two committees above mentioned.

The report was signed by L. D. Bale, W. E. Bryan, C. A. Butcher, C. H. Jones, F. W. Peters, R. H. Rice, L. R. Wagner, E. H. Scofield sponsor, and Adrian Hughes, Jr., chairman.

T. & T. Committees Have Been Active

Investigations This Year Directed Along Lines of Merchandising Transportation, Traffic Congestion, Accident Prevention and Bus Operation Have Resulted in Reports that Are Replete with Valuable Suggestions

BESIDES one joint committee with the Claims Association this year, there were but three technical committees of the Transportation & Traffic Association. Each, however, was on a vital topic and covered its subject in a very broad way. Thus, bus operation was treated under fifteen different heads and merchandising transportation under six. All reports of the association are conspicuous in the absence of statistics. This year the committees chose to record a consensus of opinion on policy methods and proper procedure. The reports taken as a whole are a veritable textbook of best practices; they form valuable reading and should produce worth-while results if put into action. Abstracts of all Transportation & Traffic reports follow.

G. H. CLIFFORD
President T. & T. Association

Merchandising Transportation

GENERAL policies or principles governing operation of street railways are not laid down by the committee nor has it cataloged individual operating practices that might result in increase of riders or revenues, except where these are of so general application as to afford a guide for the entire industry.

The report is under six general headings that relate directly to the subject assigned and reported on by selected sub-committees.

COURTESY, SALESMANSHIP AND APPEARANCE OF TRANSPORTATION EMPLOYEES

The street car operators, motormen or conductors, and all bus drivers are the salesmen of the industry. They must compare more favorably in selling ability with salesmen in other lines of business. Greater attention must be given to the training of these employees in a specific and detailed manner with a view to bringing about a standard of courtesy, personal appearance and sales practice notably high.

Courtesy, appearance and salesmanship standards attained will be in proportion to the effort used by the management in promoting these matters. This effort will not be successful until the transportation employee realizes that he is in a competitive business; that the success of this business depends upon his individual effort; that it is in his power to attract customers or to alienate them; that this competition is not temporary but permanent, and that in all cases his own prosperity, and often his job, is contingent upon his own thoughtfulness in presenting the best personal appearance, using attractive methods and co-operating in the teamwork that will produce a service satisfactory to the public.

It is not sufficient simply that the trainman listen to talks dealing with these subjects or read pamphlets on them. He must be made to understand, indorse and then demonstrate what has been taught with respect to appearance, courtesy and salesmanship. If he is too stupid to understand or is reluctant to co-operate in these practices, his service should be dispensed with. In most cases the principal part of the work is to inculcate a complete understanding of the necessity for these practices, and the part the individual must play in them.

A great many companies might well give more particular attention to the character of uniform worn by trainmen. This consists not only of insisting upon clean and well-pressed uniforms (to secure which cleaning and pressing stations have been provided on many properties), but also a complete change in uniform. Practically ever since the beginning the standard uniform has been a blue serge with more or less shapeless cut. For the purpose of offering a better front door to the business, the selection of gray whipcord uniform with military cut is suggested. It is felt that the gray whipcord uniform is more practical than blue serge and that there is a psychological value to the change.

R. N. GRAHAM
Chairman

Whenever a new uniform is adopted, the opportunity exists for a complete standardization of every detail of the uniform, so that the employee becomes identified with the company to such an extent that his appearance forms an advertisement of its service.

Since courteous treatment bulks so large in the attitude of the public toward our industry, there is a tendency to raise the age limit of men employed. Some companies now insist that the new employee must be at least 25 years of age. This higher age requirement will tend to stabilize the transportation organization, reduce turnover and add to the prestige of men and company. In this connection, the pamphlet written by George Baker Anderson, manager of transportation Los Angeles Railway, entitled "Salesmanship," covers the general field of instruction of new men so completely that this booklet is recommended to the attention of the industry.

Trainmen should be kept informed as to their accomplishments, such as accident prevention, curtailment of delays, power saving, unusual acts of courtesy, personal appearance, and, in general, the manner of acting as the company's direct representative. Bulletin boards, company publications or trainmen's meetings may be used in doing this. Trainmen should receive, when possible, information of new company plans, policies or problems. Advertising plans, policies or problems of sufficient importance could be explained, if necessary, by competent instructors.

This will enable trainmen to discuss these matters intelligently with their patrons and friends.

Some companies use selected trainmen to adjust complaints. The written or phoned complaint is given to the trainman just as it is received from the patron. This may be a real or fancied offense. The proper method of approaching the complainant, the adjustment of complaint and the closing up of the interview are explained. The trainman then interviews the complainant. In this way the trainman gets the patron's view of his fellow-workman's lack of duty or tact in handling the public. In other words, the trainman is liable to see himself as others see him.

SPECIAL CLASSES OF SERVICE AND RATES OF FARE

Special rates of fare and special classes of service are designed to augment the revenue received from the ordinary and routine transportation of passengers. But it should be borne in mind that specialties cannot make up losses from regular operation if the fundamental rate of fare is too low. There is some danger of using special rates and special classes of service to make up deficient revenues. Main consideration should be given to the development of such a standard of regular transportation service in the community as to form the basis in public favor of securing a rate of fare adequate to bring a fair return. With this condition established, then special types of service, with special rates of fare, may be expected to promote interest in and add to the number of users of the regular service, as well as to return a profit in themselves.

A number of transportation companies, both city and interurban, are experimenting with special rates of fare and special types of service designed to attract:

1. The rider who desires a superior service and is willing to pay the relatively high fare required to furnish it. Such service compares with that offered on the extra fare trains operated by the steam railroads.

2. The rider who will not pay a higher fare for superior service, but will become a customer and pay regular rates for an improved service.

3. The rider who will use the service at times of light traffic because the transportation company can then afford to sell its surplus capacity at a relatively low rate of fare.

In the first class are included parlor car service, dining and buffet cars, sleeping cars, special theater service, etc., operated by a number of interurban companies. Under this head may also be included the de luxe motor coach service which a few companies are operating to high-class residential districts.

An example of service of the second class is the "Ceramic Flyer" of the tween Steubenville, Ohio, and Beaver, Valley Traction Company operating between Steubenville. Ohio, and Beaver, Pa. This is a parlor-car limited service making only five stops in the 40-mile run, with a running time 30 minutes less than the regular service and with no extra charge.

The third class includes the use of the weekly pass, the monthly ticket, the Sunday and holiday pass, and other similar methods of attracting business during periods of light riding.

The experience of member companies along these new selling lines is as yet more or less limited, but would seem to indicate that these methods offer good possibilities of popularizing transportation service and, at the same time, attracting additional business.

During the last twelve months the Northern Texas Traction Company performed a notable piece of merchandising work in conjunction with the meeting of the American Legion in Fort Worth, Tex. The railway company, through its manager and staff, sold the idea to the American Legion that it should, as a courtesy to delegates, provide the necessary transportation as a part of the entertainment costs. The American Legion did this and also provided free tickets to other events planned for the convention. The railway company printed up small books with the necessary entrance tickets to the various events and also ten tickets of special form, each of which was good for a ride on the local cars of the Northern Texas Traction Company during any one of the four convention days. When the books were used up they could be renewed upon presentation of the old cover. The books were originally issued, as well as the renewals, at the registration desk of the American Legion.

At the end of the convention, the railway company presented the coupons to the Legion treasurer and received nearly $1,500 in payment for the transportation rendered.

Another example is the instance of the Beaver Valley Traction Company selling tickets at the regular rate of fare, but giving with them coupons which were redeemed by the merchants of the community as part payment on cash purchases of $5 or more. The company put up the tickets in books of 40, and sold the books for $2.25 each, giving with each book eight of the coupons, which had a cash value of $2 when applied to the cash purchase of merchandise. The management felt, however, that even better results would have been obtained had the tickets been sold in $1 quantities, without the 25 cents extra charge and with a reduced merchandise purchase requirement.

Several companies have profited by special party service, outings and tours. Some of the larger properties have provided comfortable waiting and lounging rooms, with quarters for the departments handling this special business.

Schools, public and private, all over the country are more and more transporting their pupils by bus. In some instances, groups of parents underwrite the cost. This type of service can usually be handled in off-peak hours and is attractive. For a moderate rate per month, buses can be assigned to school routes, making door-to-door pick up and delivery. With good chauffeurs and well-maintained buses, the service will prove to be an excellent good-will builder.

In some of the large cities, or in places where there are a large number of transients, sightseeing buses can be operated in the off-peak hours at a profit. Special week-end, all-expense tours of one or two days duration have proved popular and profitable in several instances. These tours should be organized by the company and should be well advertised.

MAXIMUM USE OF EXISTING FACILITIES

Careful attention should be given to car assignment, to the end that maximum possible use be made of good equipment. It is suggested that in many cases, by a careful selection of cars, it will be found possible to make such adjustments as will permit operation of a greater proportion of the service with the higher grade equipment, thus building up public good will, increasing receipts, and at the same time reducing operating expenses.

Sunday and holiday car assignments and, on some properties, Saturday car assignments, should be carefully studied, with the idea in mind that on these days it may be possible to operate a very much greater proportion of the service with the better classes of equipment. Such studies may show also the possibility of utilizing a greater number of one-man cars on Sundays and holidays to the improvement of the service and the decrease of its cost.

The committee urges that special consideration be given to reduction of the number of stops. This can be considered under two divisions:

1. The elimination of stops consistent with the locality will decrease the running time for the service as a whole in many cases.

2. The elimination of stops for the purpose of operating express service. This may be considered with or without co-ordination with coach operation. Interesting and successful experiments along this line have been conducted in both Providence and Baltimore.

The maximum use of existing cars and tracks cannot be had if the average speed is unreasonably low. Slow movement of street cars is also one of the chief causes of their unpopularity in this age of swift-moving automobiles.

There is a possibility of operating on a skip-stop or stagger-stop plan in rush hours and on the ordinary plan at other times. This should be given careful consideration.

In order to equalize the loading between the through cars and the short-routed cars, the through cars could be operated as "limited stop" cars, making no stops to discharge passengers between certain limits in the local territory. These limits could be judiciously selected so that the average loading of all cars would be approximately the same.

GENERAL COMPANY INTEREST IN CIVIC PROBLEMS

Every company, in addition to being a good citizen in the communities it serves, should strive to attain the higher plane of being a good neighbor. In being a good neighbor, it will be active in boards of trade, chambers of commerce and the so-called service clubs such as the Rotary, Kiwanis, Lion, American Business, Civic, etc. Such clubs, however, do not contain as large a percentage of the companies' customers as the community improvement associations, Veterans of Foreign Wars, American Legion Posts, etc.

It is important that companies take out individual memberships in such organizations as are identified with the local community interests, such as improvement associations, district and ward clubs, etc., and pay the dues of such memberships.

Every company should be active in the work of the Safety Council, whether this be a part of the national body or a local organization. Where such an organization is not in existence, and there seems to be a need for concerted action in bettering the safety conditions of the community, the company should lend every assistance in the formation of such an organization.

ADVERTISING

As an aid to getting best results from the advertising done by member companies, it is strongly urged that each company send to the director of advertising of the American Electric Railway Association copies of all advertising used in order that he may be a clearing house for such information.

There is no need to expand on the use of the newspaper as an advertising medium unless it be to point out that it should be continuous. It is better to have a brief message in the papers every day or several times a week than to have a full page infrequently.

Newspaper advertising in general should be specific and have a definite sales plan. The most successful newspaper advertising campaigns in the electric railway field have been attempts to increase traffic by suggestions that people ride to the zoo, the museum, the park, or in pushing the sale of a certain type of ticket or freight service. Merely filling your advertising space with generalities about your good service is not enough. Sell something definite.

In addition to the use of paid advertisements in the newspapers, much valuable advertising may be secured by friendly contacts with the reporters in keeping them informed fully as to the company's plans and operations.

Very few companies are using their own advertising mediums to the greatest advantage. One of the best forms of advertising in the world is the street car display.

Care should be taken, however, to obtain brevity in copy for street car posters or signs. Dash posters which are to be read from the outside of the cars should never contain more than sixteen words and it should be possible to read them from a distance of 50 ft., at least. Cards used in the inside of the car should never have more than thirty words.

Company publications distributed through the "Take One" boxes, or sent out to a selected mailing list, can be printed easily and cheaply. If kept short, snappy and interesting, they will get over to the public many of the facts about the street railway. There are many successful house organs of this character.

At the present time the total advertising appropriation of 260 electric railways in the country is between $4,000,000 and $5,000,000, which amounts to about one-half of 1 per cent of their gross income. It is felt that the industry should be spending approximately 1 per cent of its gross income annually for its advertising and merchandising efforts.

DESIGN AND CARE OF EQUIPMENT

Future design of both buses and rail cars must be as much the concern of the transportation engineer as the master mechanic. Not that the master mechanic's job is done, but rather that the transportation features demand far more attention than they have received in the past. Both the car and the bus must approach the comfort, appointments and convenience of the private automobile, as this is the largest competitor to common carrier service today.

Economies, important as they are, must not forbid conveniences. The electric car of an antiquated design, poorly maintained, does today suffer from an invidious comparison with the rubber-tired vehicle. Perhaps the best way to establish greater confidence in the electric car is to alter the design, as much to create a different appearance as to improve its operating characteristics.

Opportunity exists, particularly in the design of new equipment, to avoid some of the noise which seems inseparable from the business. Attention in this regard should be given to brake rigging. Improved motor suspension is being studied and results may be forthcoming that will reduce some of the present noise from gears.

Steel against steel is a difficult combination to combat from the noise standpoint. Perhaps the best opportunity lies in better spring construction, and elimination of as much unsprung weight as possible. The springs of a bus receive far more attention and lubrication than the springs of an electric car. Consequently during service they are more resilient and responsive in action than the more rugged, but equally important, springs of an electric car. After all is done some noise will remain. However, by using double floors, insulated side sheathing and headlining on roofs, this inherent noise can be suppressed and lessened for the passengers riding in the car.

The old style car was cluttered up with bell cords, register rods, hand straps, baggage racks, pipes and stanchions. There is no reason why the conductor's bell should not be as inconspicuous as the passenger signal; likewise a less visible arrangement for operating overhead registers is available. An attempt should also be made to make the register less noisy in its operation, and interurban whistles less offensive, and thus relieve the conscious or unconscious strain on the nerves of the passengers.

Old cars can be improved and made more popular by the addition of comfortable seats. Certainly the luxurious, deep, well-formed cushion seats on the better grades of buses are one of the drawing cards to this type of vehicle. Recently the Cleveland Railway fitted out three trains with comfortable upholstered and leather-covered seats of the semi-individual bucket type. This company's telephone lines were busy with calls as to when and where these particular trains were operating. People wanted to ride in these rather than in the older types. It may be difficult to trace a direct return from an expenditure of this kind, but if it pleases the public, the returns must follow.

The question of seat spacing is important. It is of little avail to spend money for high-grade seats if they are crowded so close together that the passengers' knees are wedged against the seat ahead. That is only spending the dollar and destroying the purchase. Even with thin backs the seating spacing should be approximately 30 in., and with thick cushioned backs the spacing should be 32 to 35 in.

Higher schedule speeds is one of the economies that contribute directly to better service. Waste time should, of course, be eliminated, and cars should be built to accelerate as rapidly as is comfortable. To avoid congestion and delays, the rate of acceleration should be equal to or exceed that of automobiles. If the autos accelerate faster than cars after traffic stops, they cut in ahead of the car and usually block the car at the next crossing, often requiring a double stop, which adds to the delay and increases the congestion. To obtain this higher acceleration in city streets, cars must be adequately motored. Gearing may be low, as rapid acceleration is far more important in increasing schedule speeds in service having frequent stops than higher free running speeds.

KEEP UP THE APPEARANCE

As an industry it should devote more care to keeping up the appearance of equipment. There is too general a tendency to consider the acquisition of new equipment an opportunity to reduce maintenance costs for a year or two, and to neglect mere appearance.

The same considerations that would dictate an unholstered seat compel the resolve to keep this seat clean and the upholstery intact. The benefit of plate glass is not fully realized unless the windows are cleaned and polished. A beautifully lacquered job does not show its real quality unless frequently washed. In industrial communities, the complete washing of cars in regular service twice a week is considered almost a minimum. The desirable point to reach would be a complete washing of the transportation vehicle on a daily basis.

Passenger and service equipment also should be kept up to high standard of appearance.

Bus and car stop signs and standards preferably should be enameled instead of painted, in order that they, in turn, may be kept up to a high standard of appearance.

This committee insists that in order to get the best results in merchandising transportation, the master mechanic and maintenance organization must recognize as keenly the necessity of good appearance as they have always recognized the necessity of efficient mechanical operation.

The report was signed by O. A.

Broten, H. L. Brown, W. H. Burke, J. A. Dewhurst, J. B. Donley, R. W. Emerson, S. E. Emmons, W. W. Holden, J. F. Johnson, E. A. Palmer, C. D. Smith, A. C. Spurr, J. C. Thirlwall, W. E. Wood, R. N. Graham, chairman; W. H. Boyce, sponsor, and E. M. Walker, sponsor.

Accident Prevention

REPORTING jointly, the committees of the Transportation & Traffic and of the Claims Association presented statistics for 1925 and 1924 of companies reporting, the number of companies varying from 87 to 175. The statistics showed improvement during 1925 in accident records, as there was a decrease in the total number of reported accidents and in every classification of those accidents with but few minor exceptions. Even the number of collisions with motor vehicles was less, although the number of vehicles increased. A few of the figures given are contained in the table below.

M. W. BRIDGES
Chairman

The following definite recommendations were made:

1. Co-operation with state, municipal and civic bodies in the work of prevention of traffic accidents on the streets and at railway crossings. Local conditions require local remedies and it is only through the active co-operation of electric railway companies with local bodies that these conditions can be met and accidents reduced.

2. That member companies send their representatives into the schools in their communities in accident prevention work that the younger generation may be educated to the danger of thoughtlessness and carelessness on our streets and around our cars and tracks. Speakers going before civic bodies, women's clubs and parent-teachers' associations with this message will do a great work in spreading the safety education which will result in reduction of the loss of life, limb and property.

3. The work of educating the employees in accident prevention work should be continuous and so arranged as to keep this subject uppermost in their minds and made a part of their every day work. In some of the companies, award and merit systems have been carried on, safety entertainments, dinners and even medals and uniforms awarded to stimulate the work of continuity of effort in the prevention of accidents.

The committee also indorses the value of moving pictures to help reduce accidents, co-operation with the National Safety Council, the adoption of a standard code for vehicles, as considered at the meeting of the National Conference on Street and Highway Safety in Washington, and close relationship between the operating, claims and safety departments of electric railways. The report was signed by the following:

Representing the Claims Associations—Seth Baldwin, B. F. Boynton, N. W. Funk, G. H. Ingles, A. G. Jack, W. H. Moore, T. C. Neilson, V. T. Noonan, E. J. Paige, R. A. Sears, J. J. Sharkey, L. F. Wynn, and H. K. Bennett, co-chairman.

Representing the Transportation & Traffic Association—E. J. Dickson, Arthur Gaboury, Roy R. Hadsell, A. W. Koehler, T. E. Lawrence, M. McCants, G. B. Powell, C. F. Schmidt, Samuel Riddle, sponsor; Edward Dana, sponsor, and M. W. Bridges, co-chairman.

Traffic Congestion

NO OUTSTANDING or single method of relieving traffic congestion was developed during the year, but the so-called Hoover conference reports indicate the method by which lasting relief may be had. If this conference had accomplished nothing more than to center national attention on this problem it would have been a great success.

Believing that the Hoover conference was the event of the year from a traffic standpoint the committee submitted a full analysis. This analysis is confined to that part of the Hoover traffic studies which directly touches the business of transportation. [This report was abstracted in ELECTRIC RAILWAY JOURNAL for April 3, 1926, page 602.]

ELECTRIC RAILWAY ACCIDENT STATISTICS

Accident Statistics	Number of Companies Reporting	1925	1924
Total number of accidents	172	341,423	352,901
Accidents at grade crossings	116	2,162	2,254
Number of persons injured	161	57,836	60,820
Number of fatalities	177	887	874
Total cost of claims	147	*$12,565	*$13,285
Miles of single track	171	19,350	19,370
Car-miles operated	173	*850,576	*866,063
Ratio cost of accidents to gross earnings, per cent	145	3.00	3.12
Ratio amount paid in settlement of claims to total cost of claims, per cent	133	63.72	65.88
Ratio cost of claims department to total cost of claims, per cent	125	23.04	22.23
Total cost of accidents per car-mile, cents	146	1.46	1.54
Number of accidents per 10,000,000 car-miles	168	3,679	3,772
Persons injured per 10,000,000 car-miles	157	690	720

* Last 000's omitted.

In addition to this the committee has considered any specific methods of relief of traffic congestion of which it learned, such as prohibition of parking, signals, subways for pedestrians and staggered hours of business.

One of the fundamental factors in determining the best method to pursue in handling the problem of traffic congestion in the downtown area in any large community is to determine first the relative importance of the different modes of transportation.

Promiscuous parking is the greatest contributing cause of congestion and the slowing up of all moving vehicles. This is a very real danger menacing downtown merchants, a danger which many of them fail to see, namely, the danger of decentralization or the driving of business to the outlying and therefore less congested business centers. It follows that street car riding shoppers will be more and more reluctant to shop downtown if their progress is impeded to such extent that their patience and allowable time are exhausted.

A. R. MYERS
Chairman

It also follows that the shopper who drives her own auto dreads the trip downtown more and more as congestion increases and her chances of parking where she wishes to shop become less and less.

If this be true, then the future of our downtown merchants in the larger cities is solely dependent upon the rapidity and convenience with which their patrons can reach them.

In an effort to throw some light on the various phases of this subject the Cleveland Railway proposed an extensive traffic survey. It enlisted and received the co-operation of the Retail Merchants Board of the Chamber of Commerce. The object of the survey was to determine how and in what proportion patrons reached the various stores in downtown Cleveland. Through the Retail Merchants Board consent of 22 stores for the survey was secured. These stores were not only the largest in Cleveland, but represented the greatest diversity in goods which they sold. [This important study and its result were covered by Ralph W. Emerson of this committee in an article in ELECTRIC RAILWAY JOURNAL of July 10, 1926.]

The survey continued three days with the addition on the third day of a large 5 and 10-cent store, which made 23 stores for that day plus a large typical office building.

The employees in the stores conducting the survey voted on the first day only. The distribution of the survey follows:

Shoppers voting	85,657
Employees voting	7,698
Total vote	93,355

	Motor Coach	Street Car	Automobile	Walk
SHOPPERS	8,910 (10.4 per cent)	53,738 (62.74 per cent)	19,551 (22.82 per cent)	3,458 (4.04 per cent)
EMPLOYEES	563 (7.31 per cent)	6,208 (80.64 per cent)	762 (9.9 per cent)	165 (2.15 per cent)
TOTAL GOING TO STORES	9,473 (10.15 per cent)	59,946 (64.21 per cent)	20,313 (21.76 per cent)	3,623 (3.88 per cent)

The above figures indicate that only about one shopper in five used a private automobile.

The committee is informed that the city of Detroit has considered and purposes to experiment on a large scale with construction of pedestrian subways from sidewalk to street centers, where loading platforms will be located, the car tracks having been spread at the selected points so as to permit of loading and unloading of cars on the so-called "devil strip" side.

Inasmuch as the plan has been fully described in the daily and technical press it is mentioned here only for the purpose of directing the future committees that they may study and report on the results of this experiment.

Automatic signal light control of vehicular traffic in congested areas is a fairly recent development and little or no engineering study had been made prior to 1925 with respect to the speed at which vehicles moved through the controlled area.

At the request of the Chicago Association of Commerce, E. J. McIlraith, staff engineer of the Chicago Surface Lines, assisted by H. B. Cammack of the same company, began a study in August, 1924, of all existing methods of handling traffic by signal light control, with the object of determining if any improvements could be made. The result of this study was the development and installation of an entirely new system in Chicago which is known there as the "co-ordinated" system. It has speeded up street car movement in the Loop area of Chicago from 25 per cent to 50 per cent on various streets. An installation embodying some of the principles of the Chicago system, but termed the "reciprocal" system (because it was believed that this name was more descriptive of the actual operation of the lights) has been worked out by engineers of the Community Traction Company in Toledo for installation in that city about Aug. 1, 1926. [The Chicago system was described in ELECTRIC RAILWAY JOURNAL March 27, 1926, page 537.]

The committee recommends that careful study be made of each installation of traffic control equipment either operating or to be installed. Continuous movement instead of the less desirable synchronous system is desirable.

This association should continue to study and keep closely in touch with the detail and minutiæ of traffic congestion, but respectfully suggests that if a way could be found to add one or more men from the Engineering Association, and a more direct contact with, and guidance of, the American Association, the work could be better done and the results attained more quickly.

The report was signed by A. W. Brohman, C. H. Evenson, R. W. Emerson, D. L. Fennell, A. J. Fink, Arthur Gaboury, J. A. Gemg, J. E. Heberle, A. L. Hodges, George Kuemmerlein, Jr., F. R. Latta, R. J. Lockwood, J. A. Miller, Jr., J. P. Pope, E. S. Rider, C. D. Smith, W. E. Thompson, J. P. Tretton, E. A. West, P. E. Wilson, sponsor; George B. Anderson, sponsor, and A. R. Myers, chairman.

Bus Operation

DIFFERING somewhat from other years, the committee on bus operation for 1926 decided that this year it would define the policies of member companies on the many features of bus operation rather than concentrate on the obtainment of statistics from member companies.

J. B. STEWART, JR.
Chairman

The committee report is, therefore, divided into sixteen sections covering the following subjects. Fares, both city and interurban; underlying reasons for higher rates of bus fare; taxation during development period; proper agency to operate bus lines in competitive territories; chartered coach and bus operations; terms of franchise, package express delivery, including handling of United States mail; utilizing the motor bus in developing better public relations and more favorable sentiment of financial interest toward electric railways; the problem of supporting non-paying route extensions; tire mileage contracts; liability insurance; double-deck bus operation—when and where it is justified; development cost; and bus accounting.

It is the committee's belief that the question asked during the earlier years of bus experience as to whether electric railway companies should undertake bus operation has been answered by the Code of Principles adopted by the American Association in 1925. The committee has included this code with reference to bus operation in its report. In brief, this section of the code stated that no medium had been developed that could replace the electric railway as a means of conveying masses. The electric railway companies supplying the local transportation should provide and control and operate all of the buses that are needed, as an auxiliary service in the communities they purport to serve. The code further states that buses should be regulated by law as common carriers and that both buses and electric railways should bear proportionate taxes and other public obligations that are fairly chargeable to them as public carriers.

UNDERLYING REASONS FOR HIGHER RATES OF BUS FARE

From a theoretical economic point of view the fare per passenger should be based on the cost of service per passenger. Consequently buses designed for mass transportation which carry large numbers of standing passengers may produce a service where the cost per passenger will be considerably less than the cost per passenger for a service rendered by a de luxe bus, where standing is either not permitted at all or reduced to a comparative minimum. Such a difference in cost should be reflected in the rates charged for the difference in the kind of service rendered. In one case the passenger receives mass transportation at a lower fare and in the other case he obtains greater comfort, probably greater speed and should pay extra for it.

Practically, where buses are co-ordinated with cars and expected to give a service identical with cars the fare should be approximately the same. If, however, the bus furnishes any element of service which the car does not furnish this added element should provide a logical reason for a higher rate.

The report closes by saying the bus service is still in a state of evolution, and opinions may not be rigidly fixed until the place of this new agency becomes crystallized with respect to existing transportation facilities. As more concrete information is developed, it is believed that succeeding committees will be in a position to set forth more definite data and conclusions on all important phases of bus use.

The report was signed by B. W. Arnold, C. H. Chapman, C. B. Cooke, Jr., E. D. Dreyfus, D. L. Fennell, R. N. Graham, S. W. Greenland, M. L. Harry, R. B. Hill, Adrian Hughes, Jr., D. A. Scanlon, Alexander Shapiro, R. H. Smith, A. T. Warner, J. V. Sullivan, sponsor; V. W. Berry and J. B. Stewart, Jr., chairman.

The News of the Industry

Seattle Mayor Has Report on Transportation Ills

In recommending operating changes for the Seattle Municipal Street Railway, Seattle, Wash., to stem the tide of decreasing revenues and patronage, all of which he says could be put into effect in 30 days, Clark R. Jackson, superintendent of public utilities, in a report filed recently with Mayor Bertha K. Landes, estimates these changes would effect a saving of approximately $800,000 a year. The most sweeping proposal is to eliminate "duplication of service" in the downtown district by turning back all cars around loops, with Pike Street as the dividing line. Under the present system, nearly all car lines traverse virtually the entire length of the retail business district. This change in operation is estimated to result in an annual saving of $612,500. Turning back cars around loops from Pike Street would not abolish the transfer system, as transfers would be issued to south-bound loop cars at Pike Street.

The report was made at the request of the Mayor and represents a month's intensive work. Recommendations for downtown operation call for one-way traffic for street cars and automobiles on First and Third Avenues and dividing the car lines into six groups to go in and out of the business districts over as many loops.

Mr. Jackson cited many advantages of the Loop system. Other features of his report show that the total number of pay passengers on weekdays for the year ended Sept. 1, compared with the calendar year 1921, fell off 4.6 per cent and the number on Sundays 25.3 per cent.

Upon receipt of Mr. Jackson's report, Mayor Landes appointed a committee of citizens prominent in civic life to consult with her on the municipal railway problem.

Seven-Cent Cash Fare in Cleveland

Fares on the lines of the Cleveland Railway, Cleveland, Ohio, will be 7 cents cash, eight tickets for 50 cents, after midnight Oct. 15. The directors of the railway so decided on Oct. 1 to curb the decline of the interest fund, which now shows a deficit of more $75,000, with losses of close to $100,000 monthly at 6-cent fare.

The advance is expected to net about $125,000 a month increase in revenues. If Cleveland Heights, East Cleveland and Lakewood pay a rate a cent higher than Cleveland's at all times, there will be $25,000 a month additional.

The interest fund will not reach "normal" until it touches $300,000 and fares cannot be reduced until it reaches $1,100,000. For many months it has been below $500,000, the point at which fares might have been increased automatically.

Efforts are under way to get the three suburbs to accept franchises with the 1-cent increases. Cleveland Heights City Council has virtually agreed to accept such a franchise in return for extensions on Mayfield, Cedar and Fairmount boulevard.

East Cleveland City Commission is holding off acceptance because it wants the company to supplant the service on the Euclid-Superior extension with through service to Public Square by way of Superior Avenue.

In Lakewood, where a sliding scale franchise on the "same-as-Cleveland" basis was adopted a year ago, fares will go to 7 cents Oct. 15 along with Cleveland's. In Cleveland Heights and East Cleveland 6-cent fares will continue till new franchises are worked out unless increases are accepted voluntarily. Lakewood is expected to make a bitter fight against the 1-cent differential.

Philadelphia Council Favors "L" Extension

A 30-year extension of the present lease of the city-owned Frankford elevated lines to the Philadelphia Rapid Transit Company, Philadelphia, Pa., was approved on Oct. 1 by the City Council by a vote of eighteen to two. The agreement with the Philadelphia Rapid Transit was sought by administration leaders with a view to relieving the borrowing capacity of the city for the amount of the Frankford "L" bonds. With this it is believed it will be possible to borrow the $5,000,000 needed to finance the Sesqui-Centennial.

The bill provides that the Philadelphia Rapid Transit Company in consideration of the extension of the lease of the Frankford "L" for 30 years shall pay $903,000 annually, which is the full interest and sinking fund charges on the $13,421,000 bonds. The amount represented by the bonds would be added to the city's borrowing margin if the Public Service Commission and the Court of Common Pleas give their approval. W. W. Roper, member from Germantown, and Clarence K. Crossan, counselor representing the northeast, voted against adoption of the ordinance. Criticism of the compact came from various sources, dealing chiefly with the "untimeliness" of extending the lease with negotiations for the new Broad Street tube still pending. C. Oscar Beasley, counsel for the United Business Men's Association, announced that a taxpayers' suit was contemplated to upset the granting of the lease. An amendment to the agreement providing for a recapture clause which would allow the city to recover the line upon six months' notice was offered in Council by Mr. Beasley through W. W. Roper, but it was rejected.

The Mayor said he felt the provisions of the agreement were fair and equitable to the city and, unless otherwise convinced, he would go ahead and sign the measure.

Kansas City Ordinance Passed a Second Time

At the meeting of the Kansas City, Mo., City Council on Oct. 4 the ordinance passed the previous week and providing for a twelve-year extension to the existing street railway franchise was again hailed into the Council for another vote. Mayor Beach, who has strenuously opposed the passage of the bill, filed a notice with the city clerk on the preceding Saturday, causing the bill to be sent back to the Council, although that body had unexpectedly passed the measure by a majority vote at the preceding meeting. Despite the Mayor's charges that the bill's passage had been by "arrangement" between the five Democratic Councilmen and William G. Woolfolk, president of the Kansas City Public Service Company, the bill was repassed with the same party vote as in the earlier passage, after a heated discussion.

Following the passage of the bill for the second time, the Council approved the appointment of a committee of five Councilmen, including A. N. Gossett, chairman; Henry L. McCune, C. Jasper Bell and C. A. Burton. This committee was instructed to meet with Mr. Woolfolk at an early date to enter negotiations for a complete new city franchise to replace the extended one now in existence. Mr. McCune expressed the opinion that a new franchise could be worked out within 30 days that would be satisfactory to all concerned.

The appointment of this committee was in accordance with a suggestion of Mr. Woolfolk, from whom the Councilmen and the city manager received letters on Sept. 29, stating that he was ready at any time to negotiate with the Council or other officials for a new franchise. All Councilmen are said to be in favor of such negotiations at as early a date as possible.

The principal objection to the extension is apparently in connection with the valuation set upon the local railways property by the new operating company. The Kansas City Public Service Company purchased the properties from the federal court for a nominal bid of $8,000,000, while the franchise measure passed this week was constructed on a basis of a $34,000,000 valuation. Mayor Beach contends that the valuation should now be cut to a fair value of the bonds used in the purchase of the properties, since the railways had suffered for many years as a result of overvaluation.

Indiana Commission Collects More Than Expenses

Collections made by the Indiana Public Service Commission during the fiscal year just ended total $295,692, or more than twice the expenses of the commission for that period, due to a system of collecting established by Howell Ellis, secretary. In his report, which covers activities of his department from Oct. 1, 1925, until Sept. 30, this year, Mr. Ellis points out that there has been a 100 per cent collection of all fees due the state as a result of formal orders issued by the commission. This has been accomplished through a rule established by Mr. Ellis, with the approval of the commission, that no order promulgated by the commisssion go into effect until the utility pay costs for conducting hearings and investigations.

The report shows that total expenditures of the commission for the year were $144,355, which is $26,644 less than the appropriation for the commission in the state budget. This latter sum will be turned back into the state general fund. Fees collected were $151,607 in excess of the actual operating expense of the department. The fees collected aggregate the largest amount ever collected in one year and expenditures for the year have been the lowest for the last five years.

Improvements Planned for Expediting Service in Tacoma

An active program of improving its tracks and the pavement along its rails, of repainting its cars and otherwise bettering its rolling stock and lines was outlined recently by the Tacoma Railway & Power Company before the City Council of Tacoma, Wash. The company states it will add about 25 men to its maintenance crews and will increase its monthly expenditure to about $23,000. In addition $39,000 will be spent on paving McKinley Avenue, where $35,000 was spent last year.

Plans will also be made at once to speed up service on all street car lines, to reduce operating costs by collecting fares at outlying points both on inbound and outbound trips and to install the skip-stop system. The report issued by the company shows that earnings are still disappointingly low under the new fares in force, but that the first weeks of August showed improvement over July figures. The fact that 60 per cent instead of 40 per cent of riders, as expected, are using tokens is throwing earnings off estimates.

Illinois Cities Denounce Utilities in Move for Home Rule

The growing hostility of many cities and villages of Illinois to state control of public utilities was again evidenced at the second "home rule" conference of the Illinois League of Municipalities, held in Rockford on Sept. 23.

Mayors, attorneys and Aldermen from 30 different cities dennounced the Illinois Commerce Commission as a "body of tyrants" and pledged their support to a finish fight to restore local sovereignty.

City Attorney W. S. Spaulding of Springfield declared that the utility companies "are gradually edging themselves into control of the government, instead of the government controlling them."

The conference adopted a set of resolutions demanding that the public utilities act allowing cities to withdraw from control of the Commerce Commission be amended so that the process could be carried out speedily, and that appeals from decisions on utility questions be made by the courts instead of by the Commerce Commission.

Chicago Transportation Heads and Bankers Disclose Merger

A plan for the consolidation of Chicago's entire traction properties, embracing all the surface lines and the elevated system into a new $250,000,000 corporation, is fast taking shape in the hands of committees representing all the companies.

A general scheme of consolidation with an interchange of transfers between surface lines and possibly motor coach lines, with tentative agreements as to extensions of lines and the use of subways, has already been reached by bankers representing surface line bondholders and executives of the elevated lines. It is based on the belief that the city will be able to secure state legislation permitting the granting of an indeterminate permit and then formulating an ordinance along this line. The general plan will be presented to the City Council committee on local transportation in a short time.

Under the present arrangement the Surface Lines will be taken into the consolidation at about the current purchase price to the city, as fixed in the 1907 ordinances. This is approximately $165,000,000. It is expected that the elevated lines will be taken in at about $80,000,000. The new corporation would have a bonded indebtedness of something like $200,000,000, or sufficient to convert the present outstanding bonds of the various companies. Some of the present junior securities would be converted into stock of the new company.

The plan contemplates that the city shall forego its present share of 55 per cent of net earnings. Just revenues and the increase in earnings expected would be devoted to two purposes: First, extension and improvements to the properties, and, second, amortization of the funded debt of the company over a period of years. It is further suggested that the city shall own the entire system when the bonds are paid off, or that the city may assume ownership at any time by paying off outstanding obligations, which will decrease from year to year. The plan calls for city construction and ownership of the first subway tubes, the cost to be defrayed by the present $45,000,000 traction fund accumulated by the city's division of earnings in the last twenty years. Extensions of subways would be taken care of by earnings or additional security issues.

If the purpose in general is sanctioned by the Council committee it is planned to organize the new corporation without waiting for the present surface lines franchise to expire and the present bonds of the companies become due next January. The bondholders of the Surface Lines will be asked to accept bonds of the new company on an equal basis, with the option of selling their bonds for cash at a discount of probably 10 per cent, which is well above current market prices. Holders of the obligations of the Chicago Rapid Transit Company will be asked to accept new securities of approximately equal value.

The Council sub-committee on local transportation was recently told by traction executives and bankers that if the Aldermen's fight for "home rule" over rates and service on the elevated and Surface Lines systems continues, the city's traction problem will be more chaotic than ever.

Even with both the bankers and traction people willing to have the city control the local utilities, the State Legislature would undoubtedly oppose such a plan and refuse to give the city powers to make it effective.

Certificate for St. Louis-Kansas City Line Denied

Judge Henry Westheus of the Cole County Circuit Court at Jefferson City, Mo., on Sept. 20 sustained the action of the Missouri Public Service Commission in refusing to grant a certificate of convenience and necessity to the St. Louis-Kansas City Short Line Railroad for the construction of an electric railway between St. Louis and Kansas City. The formal entry in the Circuit Court records of the order was delayed to enable counsel for the proposed road to prepare a motion for a new trial and an appeal to the Missouri Supreme Court.

The commission in May, 1925, declined to grant the certificate, which is the equivalent of a franchise, because the promoters of the road had failed to convince the commissioners of their ability to finance the project properly. However, they were given a year in which to present additional evidence of financial stability. Such evidence has not been given to the commission. When the state commission finally decided that the company could not get the desired certificate an appeal was taken to the Circuit Court.

The incorporators were Lee Dunlap, Kansas City, former State Factory Inspector, and several other residents of Kansas City and St. Joseph, Mo.

Made-to-Order Service in Georgia

"Made to Order" is the way the Georgia Railway & Power Company, Atlanta, Ga., characterizes the service it wishes to give its patrons. The company is conducting a campaign among the employees for ideas as to how the service can be improved. The thought suggested to each employee is, if he were an executive of the company, what could he think of to improve the service; in this way changes must be considered from the points of view of both the patron and the company. Any suggestions offered will be put before the officials of the railway and practical and helpful changes will be put into effect.

Insignia of Coffin Medal Applied to Pennsylvania-Ohio Equipment

Quick work on the part of the Pennsylvania-Ohio Electric Company resulted in the fixing of the insignia consisting of reproductions of the Coffin Gold Medal on the side of every car and bus before it rolled out of the barns last Wednesday morning. The award was not formally presented until late Tuesday evening Oct. 5, but the spirit that prompted C. S. MacCalla, R. N. Graham and the employees of the company to win the prize made it possible to rush the job of applying the transfers on to the car panels so that the citizenry of Youngstown and the neighboring communities might know that here was a gold medal road.

Power Project Revived at Kansas City

The engineering firm of Woolfolk & Company, Chicago, and the banking firm of Eastman, Dillon & Company, New York and Chicago, are to be brought actively into the negotiations on the projected Osage River hydro-electric project. It is proposed that the Kansas City Power & Light Company and the Kansas City Public Service Company, the successor to the Kansas City Railways, jointly operate and control the hydro-electric project.

William G. Woolfolk is senior member of the engineering firm. His engineering partner, Frank L. Conrad, vice-president of Woolfolk & Company, will investigate the engineering features.

The suggestion is made that the two Kansas City public utilities take over control of the development, independent of the arrangements for financing its construction. The present proposal provides for the use of the new power as an auxiliary supply for the power and light company and the railways.

Following the failure of the original promoters of the project to arrange the sale to the Kansas City Power & Light Company and the Kansas City Railways, a proposal was advanced to the United Light & Power Company, holding organization of the local power and light company, to finance the development of the project.

After the Kansas City Public Service Company became the tentative owner of the local railways Mr. Woolfolk stated that the hydro-electric project would be considered by his company as a possible power development for the railway, since the present railway plant is considered inadequate.

Mr. Storrs on Vacation

Lucius S. Storrs, accompanied by Mrs. Storrs, sails for Europe on Saturday, Oct. 9, where he will take a brief vacation returning about the middle of November. When asked about his itinerary, he replied that his idea of a vacation was not to have any. He did intimate, however, that he would probably visit points of interest in England, France and Germany. Without doubt he will take occasion to look into the new car designs which have been reported from Paris and Berlin during the last few months.

News Notes

Contributions Sent to Florida by Chicago Men.—Donations of officers and employees of the Chicago Surface Lines, Chicago, Ill., to the Red Cross for Florida relief amount to $13,500. This exceeded by $1,000 the quota fixed by the Chicago Association of Commerce for all utilities in Chicago. Under this quota the Surface Lines was expected to raise only $2,500.

Twenty-eight One-Man Cars Expected.—Announcement has been made by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., that approximately 28 one-man cars will replace the present 23 two-man cars on the Oakland-Delaware line in accordance with an order issued to that effect by the commission on Sept. 14. The change will be made about Nov. 1.

Good Morning—Grand Rapids Welcomes You.—A greeting card is the latest idea of the Grand Rapids Railway, Grand Rapids, Mich. The plan is to send good morning folders to the different hotels of the city from time to time during conventions, and at other times so that guests will have a message from the railway before they have done any sightseeing about the city. The welcome folder with the company's monogram can be kept as a souvenir. It tells about the electric rail coaches, the places of interest en route and the small expense incurred for such de luxe travel.

New Extension Being Operated.—For the first time since the war the Key System Transit Company, Oakland, Cal., has completed and is now operating a new extension. This latter, approximately 1 mile in length, was built along Park Boulevard, crossing Dimond Canyon on the new bridge and providing means of transportation for a recently built up section of Oakland that has previously been inaccessible so far as street car traffic is concerned. The cost was $40,000.

Benefit Association Formed. — A mutual benefit association has been organized by employees of the Northern Ohio Power & Light Company, Akron, Ohio. Benefits are $10 per week, commencing on the eighth day of disability. Dues are $1 per month. F. S. Summy, who has been associated with the company for several years, has been selected secretary-treasurer.

Tramway Refuses to Pave.—The Denver Tramway, Denver, Col., on Oct. 1 notified City Engineer Vickery that it was not disposed to pay for any paving between its tracks on various streets designated by the city engineer as in need of paving. The company took the stand that if it had a perpetual franchise it did not have to pay for the paving.

"E" on Sleeve Means Efficiency.—Thirty members of the transportation department of the Georgia Railway & Power Company, Atlanta, Ga., will wear a coveted "E" on the sleeves of their uniforms as a result of a campaign to promote efficiency of operation. Of the 30, 21 are conductors and nine motormen. These 30 trainmen are the first to meet the requirements specified. The method used by the company in awarding efficiency emblems is to set a "bogie" in power saving for motormen and a similar "bogie" on the Ohmer register for conductors. In order to gain the coveted emblem, this "bogie" must be met for three consecutive months. In order to secure the "E," conductors must work twenty days during each month with an average of 97 per cent or over, making it as difficult an accomplishment for the conductors as for the motormen. The campaign has been under way only three months.

Extends Air Mail Service.—The air mail service provided by the Philadelphia Rapid Transit Company, Philadelphia, Pa., between Philadelphia and Washington will be extended to Norfolk on Oct. 10. The mail will be transported between Philadelphia and Norfolk in 3½ hours. This new service will place Norfolk in touch with overnight air mail service between Norfolk and Chicago by way of New Brunswick, N. J. Letters mailed in Norfolk at noon with special delivery stamps will be delivered in Washington and Philadelphia the same day.

Uniform Fare Desired.—The Southern Public Utilities Company, Charlotte, N. C., has received numerous requests from its Winston-Salem patrons to provide a uniform fare for all its lines there. At present the fares range from 5 cents to 10 cents. Only one bus line, that to the Union Station, has street car transfer privilege, but patrons of other lines are asking that the same privilege be accorded. Should this rate be established, with transfer privilege, patrons could go from any section of the town to another on only one fare.

Disapproves Traffic Plan.—The citizens' bond issue supervisory committee of St. Louis, Mo., by a vote of twelve to one on Sept. 20 decided against the plan of Director of Streets and Sewers Brooks to place street cars on Olive Street. The plans would put cars in a center parkway on Olive Street when that thoroughfare is widened from 60 ft. to 100 ft. between Twelfth Boulevard and Channing Avenue. Director Brooks' plan has been approved by the Board of Public Service.

Doing a Bit in a Big Way.—The Key System Transit Company of Oakland, Cal., has just "done its bit" to aid the Florida relief fund now being raised in the East Bay cities. A big theater was offered in which to hold the benefit show that began at midnight, Oct. 2, and lasted till 3 o'clock in the morning. Prominent actors and actresses gave their services free. There were ten bands and a big crowd came to enjoy the show. Oakland, however, is without all-night transportation; the cars stop running between 1 and 2 o'clock in the morning. The problem then arose, how to get the crowd home? The Key company solved this problem in a public-spirited way. Cars were sent to the theater where the benefit was held at 3 o'clock in the morning, and those who so desired were transported to their homes free of charge.

Recent Bus Developments

Bus and Interurban to Stone Mountain Memorial

With the completion of a hard-surfaced road from the town of Stone Mountain to the memorial carving on Stone Mountain itself, bus service has been resumed between the interurban terminus and the mountain by the Georgia Railway & Power Company, Atlanta, Ga. In the shuttle service are seventeen passenger buses, painted cream and white, the same combination used on the Morningside and Virginia Avenue buses of the Atlanta Coach Company. The coaches will meet each interurban car as it arrives in Stone Mountain, carrying passengers wishing to see the memorial around the mountain and back in time to catch the next interurban. In case visitors wish to stop over, they can do so, taking the bus back at any time.

A special Sunday service to Stone Mountain has just been started by the Georgia Railway & Power Company which is proving very popular. Stone Mountain interurban cars are dispatched on a 30-minute schedule Sundays instead of the usual one-hour schedule, with a special price of 75 cents for the round trip, including car and bus fare.

Bus Line in Logan, Utah

Permission to abandon its street car line in Logan, Utah, and to substitute a bus line has been granted the Utah-Idaho Central Railroad by the Public Utilities Commission of Utah. The decision allows the company to tear up its tracks and repair the streets where the tracks have been.

Application for permission to abandon the railway was filed by the railroad on Aug. 4. This application declared that for many years the car line had been operated at a loss; that the revenues from such operation had been insufficient to meet the actual operating expenses, much less to pay interest on the capital invested. It was pointed out in the application also that, because of the growth and expansion of the city of Logan, the present street car line was inadequate to serve all the city, and that it was not feasible nor practicable to build other lines to certain sections. The application declared that it would be possible to give the citizens of Logan much better service with a bus line than with an obsolete railway. Permission was asked to operate the motor vehicle line, charging 7 cents for single fares, three fares for 20 cents, and selling twenty school tickets for one dollar.

At the hearing the commission found that a fair value for the 3 miles of track in Logan was $86,400; that the interest upon the fair value, at 8 per cent, would be $6,912. The net income in 1925, excluding interest and maintenance, was $1,599. A franchise to operate as a common carrier by motor vehicle of passengers over the streets, alleys and public places of Logan has already been granted by that city to the company.

Developments Continue in Lincoln Bus Tangle

The Lincoln Traction Company, Lincoln, Neb., a subsidiary of the United Light & Power Company, has made application to the State Railway Commission and the City Council for authority to substitute eleven buses for car service to the state hospital for the insane, the state penitentiary, the state college of agriculture, to Bethany suburb, and for a crosstown line, with the same fare as prevails on street cars, 10 cents cash and four tokens for 30 cents is asked, with 2 cents more beyond certain fare limits.

E. R. Heiny, general superintendent, in a communication to the Council, said that it was doubtful if there was enough business in the city to pay the operating expenses of one company, but that the owners were committed to do whatever was possible to maintain the system. He claimed that for the last two months the net income has been $1,700 each month less than enough to meet fixed charges. In order to avoid the payment of $16,000 paving tax in a newly created district the company has asked the authorities for permission to abandon six blocks of track on the old Epworth lake park line, and at the hearing a petition was presented from property owners asking that the company's tracks be removed and the street improved.

In addition to this situation City Attorney Peterson has advised the City Council that a recent Supreme Court decision places entirely within its hands the question of whether any permits to operate buses are granted. He says that this power also includes the question of how far the substitution of the bus for the street car shall go, whether there shall be free transfers between buses and cars, and the matter of securing bus service for newly developed areas of the city.

C. N. Chubb, general manager of the United Light & Power Company told a group of business men at the Chamber of Commerce that the directors of United Power have agreed to expend $1,300,000, estimated cost of the rehabilitation of the traction company, if the proper co-operation can be secured from the progressive business element of the city.

The discouraging feature of the Lincoln situation, he said, was that out of a clear sky came competition, referring to the request of the Omaha, Lincoln & Beatrice interurban to penetrate the downtown business section, where its rails never entered, with buses. Mr. Chubb said his company was willing to step out if any other company wished to operate the system in this city, where now there is no chance of one making an adequate return on its investment, but if no other company was willing to do that he thought his company should be given full leeway.

Buses Between Hamburg and Buffalo.—The Public Service Commission has issued a certificate of convenience and necessity to John F. Burke, as receiver of the Hamburg Railway, for the operation of bus lines between the village of Hamburg, N. Y., and the city of Buffalo over two distinct routes. It is proposed to operate four buses, with a fare of 40 cents, from Hamburg to Buffalo, divided into four zones, with a 10-cent fare in each, except that the fare on Ridge Road extension will be 5 cents. Local passengers are not to be carried in Athol Springs or between Athol Springs and Woodlawn and from Buffalo, nor in the city of Buffalo.

Would Substitute Bus Line. — The Scranton Railway, Scranton, Pa., has filed application with the Pennsylvania Public Service Commission for permission to abandon the Wilson Creek-Forest City trolley line. This permission is sought on the ground that operation is expensive and also unsafe because of mining conditions. Coincidental with the filing of the application for abandonment the Scranton Bus Company, a subsidiary of the railway, requested permission to operate buses in the same territory. The buses would run from Forest City over the public highway to the city hall and Carbondale. J. J. Coleman, vice-president and general manager of the Scranton Railway, explained that with the bus and trolley schedules to be arranged improved transportation facilities would be furnished.

Riding Into the Past by Motor Coach.—The Fifth Avenue Coach Company has published in leaflet form an account of the engagements during the Revolutionary War on Manhattan Island between Sept. 15 and Nov. 16, 1776. A most interesting feature of the leaflet is an excellent map showing the movement of the American and British troops prior to the battle of Harlem Heights on Sept. 16. The greater part of the district described is now served by coaches of the company.

Buses to Replace Cars on Some Troy Streets.—The Public Service Commission recently approved a declaration of abandonment by the United Traction Company of certain tracks in the city of Troy, N. Y. Simultaneously with such approval a certificate was issued to the Capitol District Transportation Company, Inc., a subsidiary company of the United Traction Company, to operate buses over the same route.

Church Charters Bus for Parishioners.—The Union Federated Church, East St. Louis, Ill., started on Sept. 19 the hiring of a bus from the East St. Louis & Suburban Railway to increase attendance at the Sunday morning services. On that day there was an appreciable increase in the attendance at the church and sunday school services. The plan, which will be tried out for six weeks, originated with the pastor, the Rev. Walter Schlaretski. He interested nine members of the congregation in his idea and they are now paying for the use of the bus. Each Sunday morning the bus starts out on a round of collections, picking up parishioners and their children. It reaches the church at 9:30 a.m.

Financial and Corporate

P.R.T. Stock on Sale to Public

The public is again invited by the Philadelphia Rapid Transit Company, Philadelphia, Pa., to participate in the purchase of the last $5,000,000 of its 7 per cent preferred stock, being the remainder of an issue of $15,000,000 which was authorized by the City Council a year ago. The first $10,000,000 of the issue was purchased by the public some months ago. The stock is offered at par, which is $50 a share. This stock has no voting power, but its dividends are preferred over the common or voting stock. Right is reserved by the company to purchase outstanding stock at any time for $55 a share. Subscriptions can be made by mail to Securities Department, 433 Land Title Building.

It is the desire of the Mitten Management, Inc., that the stock be as widely distributed as possible, and to aid this purpose the stock is offered on the installment plan. The public can purchase the stock at the rate of $1 a week per share.

It is said the company will use a large part of the money in expanding its bus system and the city taxi system and to retiring securities. Approximately $800,000 will be spent in the installation of new service, construction of repair and garage buildings, and $150,000 will be used for bus service equipment. An appropriation of $1,700,000 will be made for extensions and improvements.

Deficit on Mexico Tramways in 1925

The gross earnings of the Mexico Tramways, Mexico City, Mexico, for the year ended Dec. 31, 1925, was $9,997,033 (Mexican currency), compared with $11,692,369 for 1924. The operations resulted in a net deficit of $530,255, after allowing for taxes and depreciation. This is a decrease of $684,834 on the net earnings for 1924. Managing Director Conway in his report, included in the twelfth annual report of the board of directors, said that the situation created by the jitney competition had been itensified owing to the improved organization of the jitney service and the co-operation of the jitney owners throughout the whole of the city and suburban districts. Aside from the question of the jitney competition, the company's gross and net earnings suffered heavily from a serious strike during the first two weeks in March. Apart from the financial loss of the company, the effect of the strike was to destroy for some time all discipline among the men, but during the latter months of the year this discipline was restored, conditions greatly improved, and a harmonious relation re-established between the company's officials and the men.

As a result of explaining the financial situation of the company to the President of the republic and to the Minister of Finance, a decree was published on June 29 which relieved all tramway companies from the 5 per cent tax on gross passenger earnings. Every effort was made during the year to reduce operating expenses to the lowest limit, and during the first few months of the year the staff in the shops was reduced by about 250 employees.

For repairs and maintenance of equipment the sum of $1,766,078 was spent during the year. For the same period $929,978 was expended on the track, overhead lines and buildings. The cost of operation decreased $112,093, and by the abolition of the tax on passenger earnings, already referred to, in the month of June, the amount of taxes over the whole year decreased $279,290. Owing to the continued decrease in gross earnings no improvement in operating expense ratio is reflected by the reduction in expenses.

	— Mexican Currency —	
	1924	1925
Car Earnings:		
Passengers	$8,932,977	$7,635,801
Monthly tickets	1,622,708	1,415,932
Chartered cars	45,857	49,251
Freight	351,874	339,050
Baggage and parcels	127,340	107,628
Funeral	230,336	211,723
Omnibus	241,563	78,081
Total	$11,552,657	$9,837,468
Miscellaneous earnings	139,712	159,564
Total earnings	$11,692,369	$9,997,033
Expenses:		
Operation	$6,594,912	$6,482,819
Maintenance, taxes and depreciation	4,942,878	4,044,469
Total expenses	$11,537,790	$10,527,288
Net earnings from operations in Mexico	$154,579	*$530,255
Passengers carried:		
1st-Class	69,625,847	62,947,208
2nd-Class	28,469,758	22,561,126
Omnibuses	1,961,634	510,805
Total	100,057,239	86,019,139
Car mileage:		
Motors and trailers	17,688,506	17,167,951
Gasoline and mule cars	79,907	113,430
Freight and sundry	606,037	604,098
Omnibuses	545,284	205,362
Total	18,919,734	18,090,841
Average number of passenger cars operated per day		
Electric	382.99	379.59
Gasoline and mule car	3.99	3.90
Omnibuses	12.02	3.98
Total	399.00	387.47
Average receipts per passenger car mile	.5965	.5283
Operating expenses, including taxes and depreciation, per car mile, passenger service	.6049	.5755
Daily average earnings from operation	$31,946	$27,389
Daily average operating expenses, including taxes and depreciation	31,524	28,841
Percentage of gross expenditures, including taxes and depreciation, to gross earnings	98.68%	105.30%

*Deficit

The total capital expenditure during the year was $661,248. On the other hand, property had been retired against the depreciation account valued at $520,374, making the net amount chargeable to capital, $140,873.

Commission Approves Kansas City Financing

The Public Service Commission of Missouri at Jefferson City on Sept. 29, eliminated the only remaining barrier to the operation and control of the properties of the defunct Kansas City Railways by the new Kansas City Public Service Company when it approved the proposed financing plan of the new company. At the same time the commission approved the transfer of technical control of the property from Powell C. Groner to the Kansas City Public Service Company.

Mr. Groner, who is chief counsel of the new company, bid for the property at the bankruptcy sale held in Kansas City by the federal court, bidding in representation of the first mortgage bondholders. Recently, first mortgage bonds, collateral gold notes and promissory notes to the total value of $24,542,602 were deposited in the vaults of the Federal Reserve Bank in Kansas City by Mr. Groner, who is also a vice-president of the new company. The securities deposited were those issued by the Kansas City Railways and are said to represent approximately 97 per cent of the outstanding indebtedness of that company.

It was said that, after the payment of the damage-suit claims and the preferred bills of the old company, about $3,000,000 or $4,000,000 would remain to be prorated among the holders of the first mortgage bonds of the old company. It was previously announced that such bondholders would receive prorated reimbursement in proportion to the value of bonds held, in cash rather than in securities of the new company.

Upholds Rehabilitation Against Dividend Payments on Bay State

The full bench of the Massachusetts Supreme Court has handed down a decision adverse to L. Sherman Adams in his suit to compel the trustees of the Eastern Massachusetts Street Railway, Boston, Mass., to pay dividends on the common stock and on some of the adjustment shares.

The case has been before the courts a long time and was referred to a master, Judge Frederic H. Chase. Judge Chase's report was in favor of Mr. Adams, but the full bench of the Supreme Court decided in favor of the trustees, appointed by the state, upholding their position in rehabilitating the property instead of paying dividends. The court upheld also the policy of including in the cost of service allowances for depreciation prior to the period of trusteeship, when the property was known as the Bay State Street Railway and was in a run-down condition.

In referring to the powers conferred by the law the court says: "The statute was not intended to deprive the trustees of all discretion in respect to dividends. It was intended that they should act with proper consideration for the interests of the corporation and its creditors as well as for the rights of stockholders, and the Legislature contemplated that the road should continue to be operated as a going concern."

Morgantown Properties Go Over to West Virginia Utilities

The electric railway properties of the Union Traction Company, operating the South Morgantown line through the First and Second Wards of Morgantown, W. Va., has formally passed to the control of the West Virginia Utilities Company. Sale of the Union company's property to the West Virginia Utilities Company was negotiated six weeks ago, subject to a new franchise, under which the latter concern planned to merge the operation of the Sabraton and South Morgantown lines. That franchise was granted by the Council of the city of Morgantown several weeks ago, leaving only the transfer of corporate control as the final step of the sale.

At a meeting of the Union Traction Company and West Virginia Utilities Company officials new officers and directors of the Union Traction Company, which still retains its corporate entity, were elected, all of whom are local officers of the West Virginia Utilities Company. The new officers are: President, R. P. Stacy, vice-president and general manager West Virginia Utilities Company; vice-president, O. L. Eaton, Jr., commercial manager West Virginia Utilities Company; secretary-treasurer, F. M. Burchinal, holding a similar position for the West Virginia Utilities Company, and general manager, Clark Emerson, railway superintendent West Virginia Utilities Company. The four officers, together with Judge Frank Cox, counsel, constitute the new board of directors for the Union Traction Company.

In discussing the transfer of the property, Vice-President Eaton said there would be no changes for the time being in the schedule of cars, although it was possible there will be some betterment of the schedule within a week or ten days. The patience of the public was sought in the plan for combined operation of the Sabraton and South Morgantown lines. At the present time there was much improvement work to be done on the trackage of the South Morgantown line. In all, the company expected to spend $50,000 in track improvements and paving along this line.

As to when the new through service with the new cars and improved schedule would become effective, Mr. Eaton stated that it would all depend upon the rapidity with which the repairs to the South Morgantown line could be made. He felt sure that it would be not later than Jan. 1, 1927.

Seven-Cent Fare in Oakland Results in Slight Increase

Officials of the Key System Transit Company, Oakland, Calif., have revealed that since the 7-cent fare went into effect last January there has been a big slump in patronage. The net loss since Jan. 17 is 3,725,403 on street car lines and 835,862 on the Key division, or a total loss to the company of more than 4,500,000 riders. A loss in traffic was discounted by engineers before the higher rates on cars and ferries went into effect, but it was expected that there would be an increase in revenue amounting to at least $850,000. As a matter of fact, the new rates have produced an increase in revenue of only $152,025, insufficient to equal the amount of wage increase to platform men of $238,429. In addition the company has been compelled to add the sum of $280,000 per year to interest charges in order to finance its improvement program, amounting to $3,698,789.

So disappointing has been the financial return under the new revenues that the company has been forced to abandon a portion of its projected improvement plan. The elevated over Emeryville, to speed up Berkeley traffic to the Mole, will not be built for a while. It is likely, however, that before very much longer the Key System will take steps to run an automobile ferry service to and from San Francisco. Similar service on other lines, notably the Southern Pacific, has proved highly lucrative.

Valuation of Missouri Utilities Increases

The assessed valuation of the public utilities in Missouri for the 1926 taxes was placed at $485,115,754 by the State Tax Commission in a report submitted Sept. 25 to the Missouri Board of Equalization. This is an increase of $27,796,745 over the assessment last year. The valuations recommended by the Tax Commission compared with last year includes street railways, $68,721,741, an increase of $488,641. The United Railways of St. Louis was assessed at $47,144,102 and the Missouri Electric Railroad, a subsidiary, at $782,406, a combined assessment of $47,926,508, a decrease of $55,417. Public utilities will be given an opportunity to appear before the Board of Equalization to protest against their assessments.

Gross in Philadelphia $26,675,935

The Philadelphia Rapid Transit Company, Philadelphia, Pa., has issued the following financial and traffic statement:

INCOME ACCOUNT OF THE PHILADELPHIA RAPID TRANSIT COMPANY

	Six Months Ended June 30, 1926	Three Months Ended June 30, 1926
Operating revenue........	$26,675,935	$13,768,010
Operation and taxes......	19,585,558	9,961,016
Operating income........	7,090,376	3,806,994
Non-operating income....	275,105	145,053
	$7,365,482	$3,952,047
Payments to city Sinking fund and Frankford elevated.........	402,079	201,039
	$6,963,402	$3,751,007
Fixed charges, dividends and management fee..	6,947,511	3,742,662
Surplus.................	$15,890	$8,345

PASSENGER STATISTICS OF THE PHILADELPHIA RAPID TRANSIT COMPANY

	Six Months Ended June 30, 1926			Three Months Ended June 30, 1926		
	Total	Surface, Subway and Elevated	Motor Bus	Total	Surface, Subway and Elevated	Motor Bus
Passenger revenue.........	$26,281,114	$25,011,821	$1,269,292	$13,552,720	$12,800,498	$752,222
Passengers carried.........	483,571,941	469,916,443	13,655,498	248,835,184	240,791,676	8,043,508
Average rate per passenger, cents.	5.43	5.32	9.30	5.45	5.32	9.35

Bonds Offered.—An issue of $1,500,000 Chicago, North Shore & Milwaukee Railroad first and refunding mortgage 5½ per cent bonds, series B, was offered on Oct. 1 by Halsey, Stuart & Company and the National City Company. The bonds mature April 1, 1956, and are priced at 98.50 and interest, yielding about 5.60 per cent. Proceeds of the issue will be used toward reimbursing the company for capital expenditures for additions and betterments to its properties. The company operates from Evanston, Ill., to Milwaukee, with a branch to Mundelein, Ill.

New Directors Elected. — Berry S. Spain, assistant secretary and assistant treasurer of the Nashville Railway & Light Company, Nashville, Tenn., and John C. Guild, vice-president of the Tennessee Electric Power Company, have been elected directors of the Nashville property. They succeed in this capacity H. H. Batchelor and W. R. Cole, resigned.

Receivers Appointed for Missouri Road.—E. Z. Wallower of Harrisburg, Pa., filed a petition in the federal court of Kansas City, Mo., on Sept. 14, asking that receivers be appointed to take charge of the affairs of the Southwestern Missouri Railroad, which operates electric railway lines at Joplin and at Webb City, Mo., and interurban services to Baxter Springs, Kansas, Picher, Okla., and to various other smaller cities in that district. The company, through its attorneys, on the same day filed an answer to the petition, consenting to the requested receivership. Judge Merrill E. Otis subsequently appointed F. C. Wallower and Harrison C. Rogers, both of Joplin, receivers for the company. Mr. Wallower, the petitioner, who is said to own 12,000 shares of stock and $400,000 in bonds of the company, pointed out in the petition that the interest on the bonds had not been paid for a long time and that other creditors of the company had previously threatened legal action.

Will Redeem Bonds.—It is announced that all of the outstanding first mortgage gold bonds of the Kentucky Utilities Company, Louisville, Ky. (series B and E) will be retired. The series B bonds, due 1941, will be paid on Nov. 15 at 107½ and interest and the series E bonds, due 1949, will be redeemed Nov. 1 at 105 and interest. The Kentucky Utilities Company is a subsidiary of the Middle West Utilities Company.

Audit in St. Louis Under Way.—The audit of the books of the United Railways, St. Louis, Mo., to determine whether the company is entitled to an increase in fare from 7 cents to 8 cents was started by auditors of the Missouri Public Service Commission on Sept. 27. The audit was ordered last June following the filing of the application for increased fare by Receiver Rolls Wells.

Acquisition Bonds Approved.—The Massachusetts Department of Public Utilities recently approved the issue by the Interstate Street Railway, Attleboro, Mass., of $150,000 first mortgage 6 per cent sinking fund gold bonds dated April 1, 1926, and due April 1, 1951. The proceeds are to be used solely for the payment and cancellation of $50.000 outstanding car trust notes and $100,000 in payment for the property and franchises of the Attleboro Branch Railroad.

Extra Dividend Declared.—Directors of the Pittsburgh Utilities Corporation, New York, N. Y., recently declared an extra dividend of $187,500 as well as the regular semi-annual dividend of $1 a share on the common and 2½ per cent on the preferred. The Pittsburgh Utilities as of Dec. 31, 1925, owned 491,500 shares of common stock of the Philadelphia Company and 25,000 shares of participating 8 per cent preferred stock of the Duquesne Light Company. An important subsidiary of the Philadelphia Company is the Pittsburgh Railways, Pittsburgh, Pa.

Meet on Appraisal Appointments.—A session was held on Sept. 30 by members of the Board of Public Works, Public Utilities Bureau and Mayor A. A. Will for the purpose of selecting engineers to appraise the value of the properties of the Louisville Railway, Louisville, Ky., such appraisal to be used as the basis on which to compute earnings and control fare rates. No appointment has been made as yet. A number of engineering concerns has filed proposals to handle the job.

Book Reviews

Safety Rules for the Operation of Electrical Equipment and Lines

Department of Commerce, Bureau of Standards, Washington, D. C. 64 pages. Price, 15 cents.

This handbook of the Bureau of Standards, No. 8, comprises part four of the fourth edition of the National Electrical Safety Code. The present edition is the result of the revision which has been carried out according to the procedure of the American Engineering Standards Committee and the revised rules have had the approval of a sectional committee organized in conformity with those rules of procedure.

Commerce Yearbook 1925

Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C. 800 pages. Price, $1.

This publication issued by the governernment gives a complete and authentic record in text and tables of the American trade and industry for 1925 with a view of industrial progress. Its material has been gathered from every available source and carefully digested by experts. The contents include a résumé of production, employment, domestic trade and prices. Besides discussions of transportation, finance, banking and foreign trade there are sections devoted to construction, construction materials, motor vehicles, railway equipment and electrical apparatus.

Personal Items

H. A. Mullett Goes to Minneapolis to Assist Vice-President

A prominent figure in the railway and bus field will become affiliated with the Twin City Rapid Transit Company, Minneapolis, Minn., as assistant to Vice-President T. Julian McGill on Oct. 15. This man is Howard A. Mullett, prominent in Milwaukee and Chicago and also well known in manufacturing circles. Only a little more than a year ago Mr. Mullett resigned as assistant general manager in charge of the railway and bus properties of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to join the Yellow Cab Company, in Chicago. Early in the present year, after his short service, he was named vice-president of the latter company, which is now a General Motors subsidiary.

H. A. Mullett

His splendid work in Milwaukee and especially the development of the company's bus project under his supervision paved the way for his responsible position with the Yellow Cab Company of Chicago. R. H. Pinkley succeeded Mr. Mullett as assistant general manager at Milwaukee.

In 1904, when Mr. Mullett was graduated from Rose Polytechnic Institute, he became associated with the Westinghouse Electric & Manufacturing Company, at Pittsburgh. Here he remained until 1906, when he left to join the Milwaukee Electric Railway & Light Company, as assistant to the superintendent of equipment. He did not remain assistant long, but assumed the rôle of superintendent from 1911 to 1918. In 1918 he became assistant general manager of the company's city, interurban and bus transportation department, and in 1919 his jurisdiction was extended to cover the company's newly created city and interurban bus division. Here it was that his efforts were crowned with success, for the company's bus project developed into one of the greatest in the country. Some few years ago, when the Milwaukee property acquired control of the Milwaukee Northern Railway, Mr. Mullett was made vice-president and general manager of that property in charge of operations.

Mr. Mullett was born in Louisville, Ky., in 1880. He was educated in the public schools of Kansas City.

Fred G. Buffe Appointed in Kansas City

According to an announcement made on Sept. 30 Fred G. Buffe, general manager of the Kansas City Railways for the receivers, has been named vice-president and general manager of the Kansas City Public Service Company, Kansas City, Mo., and will be in charge of all operations of the local railways when the latter company has formally taken over the property and the present receivership is officially closed. William G. Woolfolk, president of the new company, tendered the offer of the position to Mr. Buffe.

Mr. Buffe was manager of the Kansas City Railways for a number of years prior to the receivership, which has been in progress for about six years, and was retained in that capacity by Fred W. Fleming and Francis M. Wilson, receivers.

During recent years he has become very well known in mid-Western street railway circles, through his activities in the local company during the receivership and through his authoritative work in connection with the electric railway associations.

Harry Engle has been reappointed street railway commissioner of Youngstown, Ohio, by Mayor Scheible for a second term of four years beginning Jan. 16, 1927. The reappointment was approved unanimously by the Council.

Howard R. Stearns, assistant electrical engineer of the Detroit Street Railways, Detroit, Mich., has severed his connections and assumed the position of electrical engineer and statistician with the Miller-Schorn system. He had been with the city department of street railways for the past five years. Mr. Stearns was graduated from the University of Michigan engineering college and gained his shop experience with the Westinghouse Electric & Manufacturing Company. He has had experience with the valuation of electric and railway properties in Michigan and New Jersey.

J. J. Connors, safety supervisor of the transportation department of the Georgia Railway & Power Company, Atlanta, Ga., resigned recently. He has accepted a position with the Nashville Railway & Light Company, Nashville, Tenn., where he will continue his safety work. Mr. Connors spent most of his life in Nashville and was employed by the Nashville property for many years.

Norman F. Titus, San Francisco, Cal., has been appointed chief of the transportation division, United States Department of Commerce.

Obituary

Judge Cicero Lindly, vice-chairman of the Illinois Commerce Commission, died at his home in Greenville, Ill., on Sept. 23. He was 69 years old.

Chester L. Bisbee, for 28 years identified with street railway work, died at his home in Fall River, Mass, on Sept. 26. For the last fourteen years Mr. Bisbee was superintendent of the Fall River division of the Eastern Massachusetts Street Railway. He was born in Middleboro, Mass.

Clermont Harvey Wilcox, president of the New York Insulated Wire Company, and for many years head of the banking and brokerage house of Wilcox & Company, died Oct. 2 in the Fifth Avenue Hospital, New York, N. Y. The New York Insulated Wire Company, of which Mr. Wilcox was the founder, was the first company to make insulated wire in the United States.

Anderson Gilbert Moore associated with the Insull properties, died Sept. 30 in New Albany, Ind. At the time of his death he was industrial agent of the Interstate Public Service Company, Middle West Utilities and the Kentucky Utilities Company. He began work with the Rock Island & Southern Railway in the claims department. Twenty-five years ago he went to New Albany as cashier of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway, absorbed by the Interstate Public Service Company fifteen years ago. At that time he became industrial agent of the Interstate in Indiana.

Arthur Holland, prominent street railway organizer and at one time president of the United Railways of San Francisco, Cal., died Oct. 1 at his home in Concord, Mass. His street railway career began in 1901, when he was elected president of the United Railways of San Francisco. He remained as president of this company for several years, and about 1907 became instrumental in the reorganization of the York Street Railways in Pennsylvania. Later he was made president of the Bangor & Aroostook Railroad. He was born in Boston in 1850. He was educated at the Brooks School of that city and Harvard University, being graduated from the latter institution in 1872. Early in life he became prominent as an iron and steel merchant. Mr. Holland established the firm of Holland & Company, Pittsburgh, Pa., in 1894.

Nicholas B. Trist, special wheel engineer with the Carnegie Steel Company. Pittsburgh, Pa., died at his residence in Sewickley, Pa., Sept. 29. As a young man he entered the service of the Pennsylvania Railroad as an apprentice in the Altoona shops and served with this road in various capacities for about 23 years. Through Charles T. Schoen he became connected with the Schoen Steel Wheel Company upon the entrance of that firm into the manufacture of solid wrought steel wheels. Mr. Trist became connected with the Carnegie Steel Company when that company took over the Schoen Steel Wheel Company in 1908. He was born in Savannah, Ga., in 1862.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Pennsylvania Railroad Places Order for Electrical Equipment

In accordance with its program of electrification of the suburban lines entering Philadelphia, the Pennsylvania Railroad has placed an order with the Westinghouse Electric & Manufacturing Company for the electrical equipment for 93 coaches, to be used on the Wilmington Division. The contract also calls for motors and controls for four huge electrical passenger locomotives of the same type ordered from the Westinghouse company last February. The car equipment just ordered is a duplicate of that previously developed by the Westinghouse Electric & Manufacturing Company for application to the Pennsylvania standard multiple-unit coaches. The Pennsylvania Railroad already has 130 of these electric coaches with Westinghouse equipment.

Improvements to Interurban Service in Oklahoma

The Oklahoma Railway has completed a three months program of improvements on its interurban service. About $1,000 has been spent on each interurban car operating out of Oklahoma City to El Reno, Norman and Guthrie and intermediate points. In addition to a general overhauling mechanically the cars have been repainted and reupholstered. Improvements in the interurban service of the Oklahoma Railway have been steady for the past two years beginning with the expenditure of more than $100,000 for substations. These substations have so increased the power available on interurban lines that all the schedules have been materially improved, the running time between stations having been reduced considerably on the Guthrie and Norman lines.

Twenty-two Double-Deckers Put on by Fifth Avenue Company

For the improvement of its service to the public, the Fifth Avenue Coach Company, New York, N. Y., on Sept. 30 put on the streets 22 of a fleet of 45 new double-deck motor coaches. The construction of these vehicles has been carried out in the shops of the company in New York City. It is expected that the last of these coaches will be finished and put into service before the end of October.

The new coaches, while retaining the best features of the company's "L" type covered upper deck vehicles, have many special improvements and are known as the "SL" type. They have a seating capacity of 55 passengers each. All lower decks are upholstered in leather. Five coaches have upper deck seats of a rubberized automobile fabric, five are upholstered in Kemi-Suede, a newly developed material, and 35 coaches have leather seats on the upper deck. Half of the coaches have permanent covered tops and the others have "roll tops."

The engines are of the Yellow sleeve valve type, four cylinders. On the rear platform an automatic electric fare box has been installed to increase the rapidity of loading.

Five Automatic Subs for Indianapolis

The Indianapolis Street Railway, Indianapolis, Ind., placed an order with the Westinghouse Electric & Manufacturing Company a few days ago for equipment for five substations, and the order included nine 1,500-kw., 600-volt converters, 28 transformers and auxiliaries. One substation will contain three units arranged for semi-automatic operation. It will be used as the base station. Two others will have two units and operated automatically while two others having single units will also be automatic. Although supervisory control is not included in the present contract, the stations will all be built to facilitate its application.

Rolling Stock

Birmingham Electric Company, Birmingham, Ala., has placed an order for sixteen new cars with the Cincinnati Car Company. The outlay will cost $250,000.

Key System Transit Company, Oakland, Cal., has ordered eleven new Fageol buses for use on the new Berkeley-Oakland Telegraph Avenue line, service on which will begin in December. The buses will be of steel construction, of the 29-passenger type, 29 ft. 9 in. in length and with a 230-in. wheelbase. This bus line will provide way service to and from the two East Bay cities, trolley cars providing the express service, thus reversing the usual process.

Metal, Coal and Material Prices

Metals—New York	Oct. 5, 1926
Copper, electrolytic, cents per lb.	14.25
Copper wire, cents per lb.	16.25
Lead, cents per lb.	8.625
Zinc, cents per lb.	7.68
Tin, Straits, cents per lb.	71.25
Bituminous coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.00
Somerset mine run, Boston, net tons	2.025
Pittsburgh mine run, Pittsburgh, net tons	2.075
Franklin, Ill., screenings, Chicago, net tons	1.525
Central, Ill., screenings, Chicago, net tons	1.40
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.75
Weatherproof wire base, N. Y., cents per lb.	17.75
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.4
White lead in oil (100-lb. keg), N. Y., cents per lb.	15.25
Turpentine (bbl. lots), N. Y., per gal.	$0.935

MODERNIZE— —MERCHANDISE!

The most successful electric railways are continually practicing this doctrine! They strive to maintain their equipment up to the very highest point of efficiency, safety and comfort in order to successfully sell their merchandise—*service!* In the carrying out of this doctrine have you noticed that nearly all the modern cars of these companies are equipped with

PEACOCK STAFFLESS BRAKES!

Modern design demands the Peacock because of minimum platform space occupation, simplicity of operation, low installation and maintenance costs, and tremendous braking power. Their almost unlimited chain winding capacity and light weight make these brakes adaptable for all types of service.

We will gladly send facts and figures proving what these brakes have done for others and what they will do for you.

National Brake Company, Inc.
890 Ellicott Square Buffalo, N. Y.

Canadian Representative
Lyman Tube & Supply Co., Ltd., Montreal, Can.

Be Sure of Customer Confidence

The average man who rides on a street car has never entirely forgotten that famous and unfortunate "The public be damned."

It is true that unfailing service at low cost, public spirited policies, and immense contributions to comfort and convenience on the part of electric light and other utility companies have pushed the recollection farther and farther back into his memory. But it is there to crop out when any controversy with the public arises.

Whether this controversy arises from rate adjustments, merger, purchase or sale, reorganization, extensions or what not, the goodwill and fair judgment of the public can be won by a full presentation of the facts—by laying all the cards on the table.

One of the most important of these cards can be a valuation and rate study by The American Appraisal Company. It can be proved correct. It is known to be disinterested. It will find many of your important citizens welcoming it in the light of their own experience with our appraisals.

In gaining and maintaining cordial public relations, An American Appraisal is a strategic asset at a critical moment.

The American Appraisal Company

MILWAUKEE

PUBLIC UTILITIES · INDUSTRIALS · REAL ESTATE PROPERTIES · NATURAL RESOURCES

A NATIONAL ORGANIZATION

Chicago, South Bend & N. Ind. Ry. Co. Purchases 5 Studebaker Busses

—*investigation of bus operating costs by this company's engineers proved higher economy of Studebaker equipment*

FIVE Studebaker Busses, all of the 21-passenger pay-enter street-car type, were recently purchased by the Chicago, South Bend and Northern Indiana Railway Company.

The selection of Studebakers is significant, because this company has been operating several types and makes of busses as feeders to its lines in northern Indiana.

"The medium-size Studebaker Bus was selected," states R. R. Smith, vice-president and general manager of the company, "after an exhaustive examination of operating costs of all busses on the market. Our engineers found Studebakers the most economical, both in initial and operating costs.

"We selected this medium size because the experience of transportation companies everywhere shows it is the most suitable for supplying patrons with frequent, comfortable, prompt service—and for enabling the company to operate economically.

"We found our heavy-type busses both uneconomical to operate during the entire day and unsatisfactory for city service because schedules are necessarily slower.

"Larger busses seem feasible during rush hours, but the unprofitable cost of hauling the heavy equipment around during the rest of the day mounts up to such a degree as to embarrass our effort to supply the best service."

This testimony from an experienced operator speaks volumes. And the facts are supported by the cost records of hundreds of operators all over the country.

The first cost of the medium-size Studebaker Bus is half that of the average large-capacity bus. Its operating expense is lower because it is 50% lower in weight. Operators report an average operating cost of 7 to 9 cents per unit, covering gas, oil, garage, damage, superintendence, drivers' wages, repairs and miscellaneous items—against the 16 to 17 cents per mile for the same items of operating expense on the average heavy truck-type bus.

More than 1000 operators are using Studebaker Busses—convinced by actual cost records that they insure higher profit per passenger mile. For further information on Studebaker Busses of all types, mail the coupon below.

Studebaker 21-Passenger Pay-Enter Street-Car type bus (Dual Rear Wheels): $5125, f. o. b. factory. The most powerful bus chassis of its size in the world, according to the rating of the Society of Automotive Engineers

Six Body Designs, 12 to 21 Passengers $3935 to $6150

Prices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal Budget Payment Plan—Small down payment and balance in convenient monthly installments.

12-Pass. (including driver) cross-seat Sedan-Type	$3935
15-Pass (including driver) cross-seat Sedan-Type	$4295
18-Pass (including driver) side-entrance Parlor Car	$5300
19-Pass. (including driver) cross-seat Sedan Type	$5050
20-Pass (including driver) Parlor-Car De Luxe*	$6150
21-Pass. Pay-As-You-Enter Street-Car Type*	$5125

*Includes dual rear wheels

THE STUDEBAKER CORPORATION OF AMERICA,
Dept. B, South Bend, Ind.
Send me full information on Studebaker Busses without obligation.

Name..........

Address..........

City.......... State..........

We have.......... busses at present.

Check below the Studebaker Bus about which you desire information.

Type: Sedan.......... Parlor Car.......... Street-Car Type..........

Capacity:.......... Passengers.

You Wouldn't Back a Horse Carrying 20 lbs. Excess Weight

A lot of street cars are carrying an excess weight of 20 lbs. for every unit of seating capacity. How can any operator expect such cars to be big revenue producers under this tremendous handicap.

Modern cars utilizing HASKELITE for floors, roofs, linings, hoods, seat backs, etc., and PLYMETL for exterior side panels, dash, vestibule linings, etc., can show a saving in weight of 935 lbs. per car as compared with ordinary standard construction.

On the commonly accepted basis of 6 cents per lb. per year, the saving in operating expense from a cut in weight of 935 lbs. is $56.10. A saving of this size on each car means a big addition to revenue and it can be secured at a first cost no greater than for heavy equipment.

The HASKELITE-PLYMETL car is attractive, comfortable and safe. It helps you build your revenue and then it helps turn that revenue into net earnings. Note the representative list of companies using HASKELITE products for car and bus construction.

Let us send you blue-print booklets and full information.

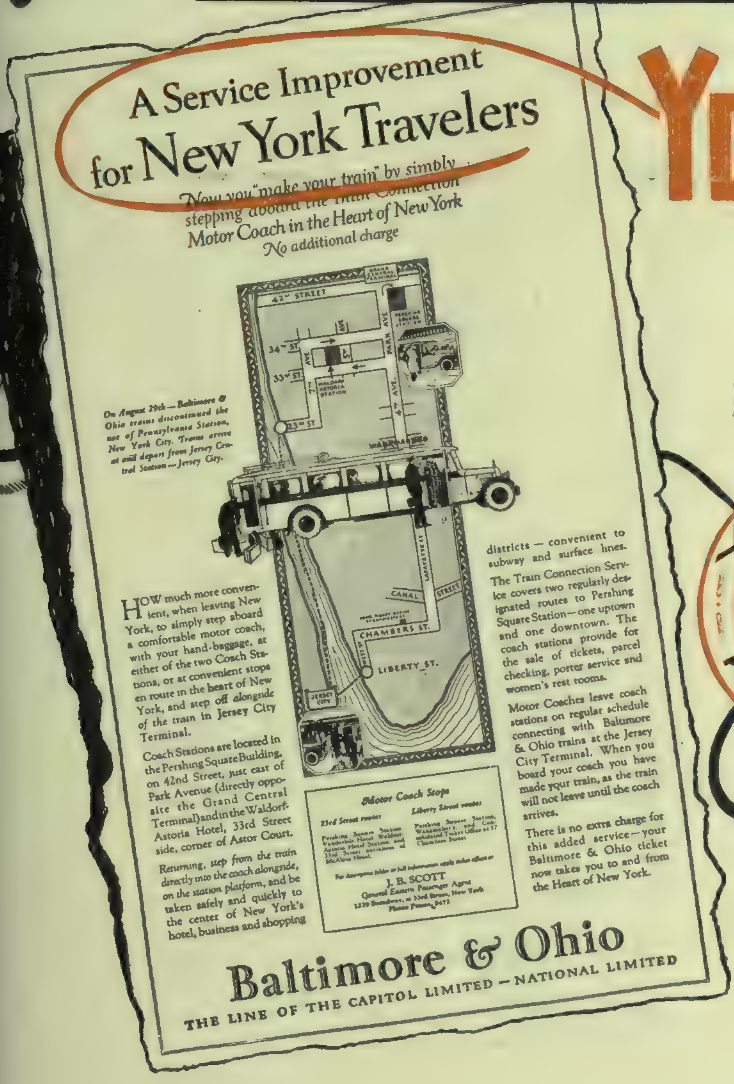
Prominent Users

Boston and Maine R.R.
  Boston, Mass.
The Chicago, North Shore & Mil. R.R.
  Highwood, Illinois
Chicago Surface Lines
  Chicago, Illinois
The Cincinnati Traction Co.
  Cincinnati, Ohio
Columbus Ry. Power & Light Co.
  Columbus, Ohio
The Denver Tramway Company
  Denver, Colorado
Detroit United Railway
  Detroit, Michigan
Fort Smith Light & Traction Co.
  Fort Smith, Arkansas
Galveston-Houston Elec. Co.
  Galveston, Texas
Grand Rapids Ry. Co.
  Grand Rapids, Michigan
Georgia Ry. & Power Co.
  Atlanta, Georgia
Illinois Traction, Inc.
  Chicago, Ill.
Indiana Service Corp.
  Fort Wayne, Indiana
Los Angeles Railway Corp.
  Los Angeles, California
Milwaukee Elec. Ry. & Light Co.
  Milwaukee, Wisconsin
Monongahela West Penn Public Service Co.
  Fairmont, West Virginia
Montreal Tramways Co.
  Montreal, Quebec, Canada
Municipal Railway of San Francisco
  San Francisco, Cal.
Pacific Northwest Traction Co.
  Seattle, Washington
The Pennsylvania-Ohio Elec. Co.
  Youngstown, Ohio
Philadelphia Rapid Transit Co.
  Philadelphia, Pa.
The Pine Bluff Company
  Pine Bluff, Arkansas
Pittsburgh Railways Co.
  Pittsburgh, Pennsylvania
Public Service Railway Co.
  Newark, New Jersey

HASKELITE MANUFACTURING CORPORATION, 133 West Washington Street, Chicago

Canadian Representatives:
Railway and Power Engineering Corporation, Ltd.
Montreal Toronto Winnipeg

PLYWOOD
HASKELITE
PLYMETL



A Service Improvement for New York Travelers

Now you "make your train" by simply stepping aboard the Train Connection Motor Coach in the Heart of New York

No additional charge

On August 29th — Baltimore & Ohio trains discontinued the use of Pennsylvania Station, New York City. Trains arrive at and depart from Jersey Central Station — Jersey City.

42nd STREET
GRAND CENTRAL TERMINAL
PERSHING SQUARE STATION
PARK AVE
34th ST
33rd ST
23rd ST
4th AVE
7th AVE
WALDORF ASTORIA STATION
WANAMAKERS
LAFAYETTE ST
CANAL STREET
CHAMBERS ST.
LIBERTY ST.
JERSEY CITY

HOW much more convenient, when leaving New York, to simply step aboard a comfortable motor coach, with your hand-baggage, at either of the two Coach Stations, or at convenient stops en route in the heart of New York, and step off alongside of the train in Jersey City Terminal.

Coach Stations are located in the Pershing Square Building, on 42nd Street, just east of Park Avenue (directly opposite the Grand Central Terminal) and in the Waldorf-Astoria Hotel, 33rd Street side, corner of Astor Court.

Returning, step from the train directly into the coach alongside, on the station platform, and be taken safely and quickly to the center of New York's hotel, business and shopping districts — convenient to subway and surface lines.

The Train Connection Service covers two regularly designated routes to Pershing Square Station — one uptown and one downtown. The coach stations provide for the sale of tickets, parcel checking, porter service and women's rest rooms.

Motor Coaches leave coach stations on regular schedule connecting with Baltimore & Ohio trains at the Jersey City Terminal. When you board your coach you have made your train, as the train will not leave until the coach arrives.

There is no extra charge for this added service — your Baltimore & Ohio ticket now takes you to and from the Heart of New York.

Motor Coach Stops

23rd Street routes: Pershing Square Station, Vanderbilt Hotel, Waldorf-Astoria Hotel Station, and 33rd Street entrance of McAlpin Hotel.

Liberty Street routes: Pershing Square Station, Wanamaker's, and Consolidated Ticket Office at 37 Chambers Street

For descriptive folder or full information apply ticket offices or

J. B. SCOTT
General Eastern Passenger Agent
1270 Broadway, at 33rd Street, New York
Phone Penna. 0472

Baltimore & Ohio

THE LINE OF THE CAPITOL LIMITED — NATIONAL LIMITED

YELLOW COACHES

**SELECTED TO MARK
A NEW ERA IN BUS
AND TRAIN CO-ORDINATION**

YELLOW KNIGHT

1

Yellow Coaches line up before the Pershing Square Station of the Baltimore & Ohio Railroad at Park Avenue and 42nd Street, New York City. When a passenger steps into a Yellow Coach he has already begun his railroad journey.

2

The departure of Yellow Coaches takes place on the dot, according to railroad time table. Passenger baggage is carried in a special compartment at the rear end of the coach. There is a luxurious seat for every passenger.

3

En route to the ferry, scheduled stops are made at hotels and principal points where more passengers and their baggage are taken on. Passengers are also picked up on signal.

YELLOW COACHES
SOLVE A TREMENDOUS TERMINAL PROBLEM—

Faced with the necessity (owing to expiration of contract with the Pennsylvania Railroad) of again using the railroad terminal of the Central Railroad of New Jersey across the Hudson River in Jersey City instead of the Pennsylvania Railroad's terminal in New York, as had been done since the World War, the Baltimore & Ohio Railroad solved their problem with motor coaches—Yellow Coaches.

"Trainside motor coach service," it is called, between the new terminus in Jersey City and the heart of New York, thus inaugurating for the first time what may be termed without reservation an integral, important and necessary part of the through passenger line of a railroad. When a passenger steps into one of the twenty-four Yellow Coaches, employed for this "trainside service," he has already begun his railroad journey.

Last year the Baltimore & Ohio carried 575,000 passengers into and out of New York. If traffic remains the same, Yellow Coaches will be faced with the transportation problem of handling an average of 1,575 passengers daily.

On Sunday, August 29th, twelve Yellow Coaches began

4

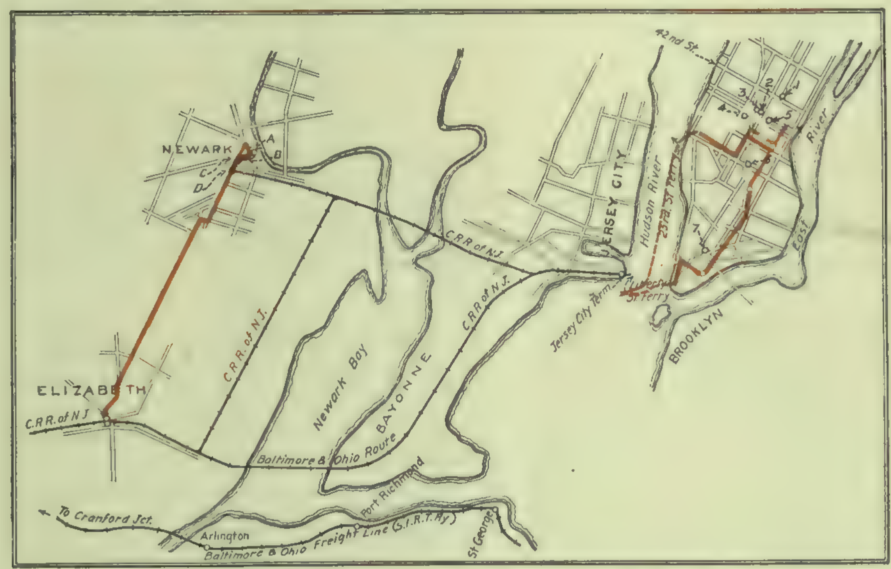
The ferry dock is approached and Yellow Coaches line up, ready to board the boat and cross the Hudson River to the train shed of the Baltimore & Ohio Railroad at Jersey City.

5

Yellow Coaches approach the ferry slip on the New Jersey side and passengers, having left the skyline of New York behind, prepare to alight and continue the remainder of the journey by train.

6

Yellow Coaches pull up beside the waiting train and unload. Baggage is quickly transferred and passengers find their car seats, refreshed by a comfortable motor coach ride.

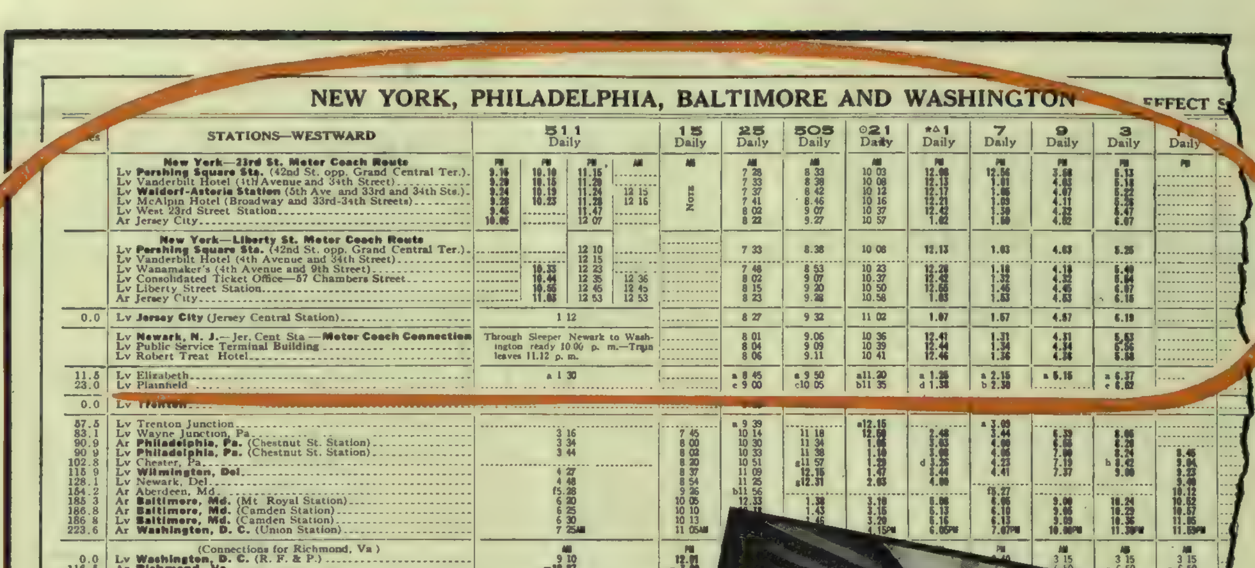


The Baltimore & Ohio's Bus Lines in New York and Newark with Railroad and Ferry Connections

operating between Jersey City and New York. Two Yellow Coaches run from Newark to meet train connections at Elizabeth, N. J. All have parlor seats for 23 passengers, in addition to the driver and attendant. Hand baggage is carried in a special compartment, partitioned off in the rear where four auxiliary folding seats are located for emergency use.

So popular has the luxurious service provided by Yellow Coaches proven, that ten more have been added to the original fleet of fourteen, making a total of twenty-four.

Thus, again Yellow Coaches are doing pioneer service in marking a new era in the coordination of motor coach and railroad transportation; acting not only as a substitute service to take the place of the lack of an actual railroad terminal in the heart of New York City, but bringing to passengers a new transportation facility having intrinsic merits all its own.



NEW YORK, PHILADELPHIA, BALTIMORE AND WASHINGTON

EFFECT S

es	STATIONS—WESTWARD	511 Daily				15 Daily	25 Daily	505 Daily	◎21 Daily	*△1 Daily	7 Daily	9 Daily	3 Daily	Daily
	New York—23rd St. Motor Coach Route	PM	PM	PM	AM	AM	AM	AM	AM	PM	PM	PM	PM	PM
	Lv **Pershing Square Sta.** (42nd St. opp. Grand Central Ter.)	9.16	10.10	11.15	....	Note	7 28	8 33	10 03	12.08	12.56	3.58	5.13	....
	Lv Vanderbilt Hotel (4th Avenue and 34th Street)	9.20	10.15	11.20	....		7 33	8 38	10 08	12.13	1.01	4.03	5.18	....
	Lv **Waldorf-Astoria Station** (5th Ave and 33rd and 34th Sts.)	9.24	10.19	11.24	12 15		7 37	8 42	10 12	12.17	1.05	4.07	5.22	....
	Lv McAlpin Hotel (Broadway and 33rd-34th Streets)	9.28	10.23	11.28	12 16		7 41	8.46	10 16	12.21	1.09	4.11	5.26	....
	Lv West 23rd Street Station	9.45	....	11.47	....		8 02	9 07	10 37	12.42	1.30	4.32	5.47	....
	Ar Jersey City	10.05	....	12 07	....		8 22	9.27	10 57	1.02	1.50	4.52	6.07	....
	New York—Liberty St. Motor Coach Route													
	Lv **Pershing Square Sta.** (42nd St. opp. Grand Central Ter.)	....	....	12 10	....	....	7 33	8.38	10 08	12.13	1.03	4.03	5.25	....
	Lv Vanderbilt Hotel (4th Avenue and 34th Street)	....	....	12 15	....	....								....
	Lv Wanamaker's (4th Avenue and 9th Street)	....	10.33	12 23	....	....	7 48	8 53	10 23	12.28	1.18	4.18	5.40	....
	Lv Consolidated Ticket Office—57 Chambers Street	....	10.44	12 35	12 36	....	8 02	9 07	10.37	12.42	1.32	4.32	5.54	....
	Lv Liberty Street Station	....	10.55	12 45	12 45	....	8 15	9 20	10 50	12.55	1.46	4.45	6.07	....
	Ar Jersey City	....	11.03	12 53	12 53	....	8 23	9.28	10.58	1.03	1.53	4.53	6.15	....
0.0	Lv **Jersey City** (Jersey Central Station)	1 12				....	8 27	9 32	11 02	1.07	1.57	4.57	6.19	....
	Lv **Newark, N. J.**—Jer. Cent Sta —**Motor Coach Connection**	Through Sleeper Newark to Washington ready 10.00 p. m.—Train leaves 11.12 p. m.				....	8 01	9.06	10 36	12.41	1.31	4.31	5.53	....
	Lv Public Service Terminal Building					....	8 04	9 09	10 39	12.44	1.34	4.34	5.56	....
	Lv Robert Treat Hotel					....	8 06	9.11	10 41	12.46	1.36	4.36	5.58	....
11.5	Lv Elizabeth	a 1 30				....	a 8 45	a 9 50	a11.20	a 1.26	a 2.15	a 5.15	a 6.37	....
23.0	Lv Plainfield	....				....	c 9 00	c10 05	b11 35	d 1.38	b 2.30	....	c 6.52	
0.0	Lv **Trenton**													
57.5	Lv Trenton Junction	....				....	a 9 39	....	a12.15	....	a 3.09	....	....	....
83.1	Lv Wayne Junction, Pa	3 16				7 45	10 14	11 18	12.50	2.48	3.44	6.39	8.06	....
90.9	Ar **Philadelphia, Pa.** (Chestnut St. Station)	3 34				8 00	10 30	11 34	1.06	3.03	4.00	6.55	8.20	....
90 9	Lv **Philadelphia, Pa.** (Chestnut St. Station)	3 44				8 02	10 33	11 38	1.10	3.08	4.06	7.00	8.24	8.46
102.8	Lv Chester, Pa.	....				8 20	10 51	g11 57	1.29	d 3.26	4.23	7.19	b 8.42	9.04
115 9	Lv **Wilmington, Del.**	4 27				8 37	11 09	12.15	1.47	3.44	4.41	7.37	9.00	9.23
128.1	Lv Newark, Del.	4 48				8 54	11 25	g12.31	2.03	4.00	....	....	....	9.40
154.2	Ar Aberdeen, Md.	f5.28				9 26	b11 56	....	....	....	f5.27	....	....	10.12
185 3	Ar **Baltimore, Md.** (Mt Royal Station)	6 20				10 05	12.33	1.38	3.10	5.08	6.05	9.00	10.24	10.52
186.8	Ar **Baltimore, Md.** (Camden Station)	6 25				10 10		1.43	3.15	5.13	6.10	9.05	10.29	10.57
186 8	Lv **Baltimore, Md.** (Camden Station)	6 30				10 13		1.46	3.20	5.16	6.13	9.09	10.36	11.05
223.6	Ar **Washington, D. C.** (Union Station)	7 25AM				11 05AM			4.15PM	6.05PM	7.07PM	10.00PM	11.30PM	11.59PM
	(Connections for Richmond, Va)	AM				PM					PM	AM	AM	AM
0.0	Lv **Washington, D. C.** (R. F. & P.)	9 10				12.01					[illegible]	3 15	3 15	3 15
116.5	Ar **Richmond, Va.**	m12.27 PM				p 3.00 PM						6 50	p 6 50 AM	p 6 50 AM

In addition to the regular Coach Train connections, frequent ferry service is operated from 23rd Street Station and Liberty Street Stat

CAR

YELLOW COACHES

as much a part of the Time Table as the trains –

Dependable train connections hinge on dependable motor coaches.

Yellow Coaches run through city traffic—New York traffic—making passenger pick-up stops at strategic, principal points. Each regular stop, coming and going, is listed as part of the Baltimore & Ohio time table. Yellow Coaches must hold to schedule; they must arrive and leave on time, for upon them depends the operation of the trains.

For every type of transportation service, Yellow Coach plus General Motors stand behind the operator with experience and equipment ready to assure low-cost, profitable miles.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

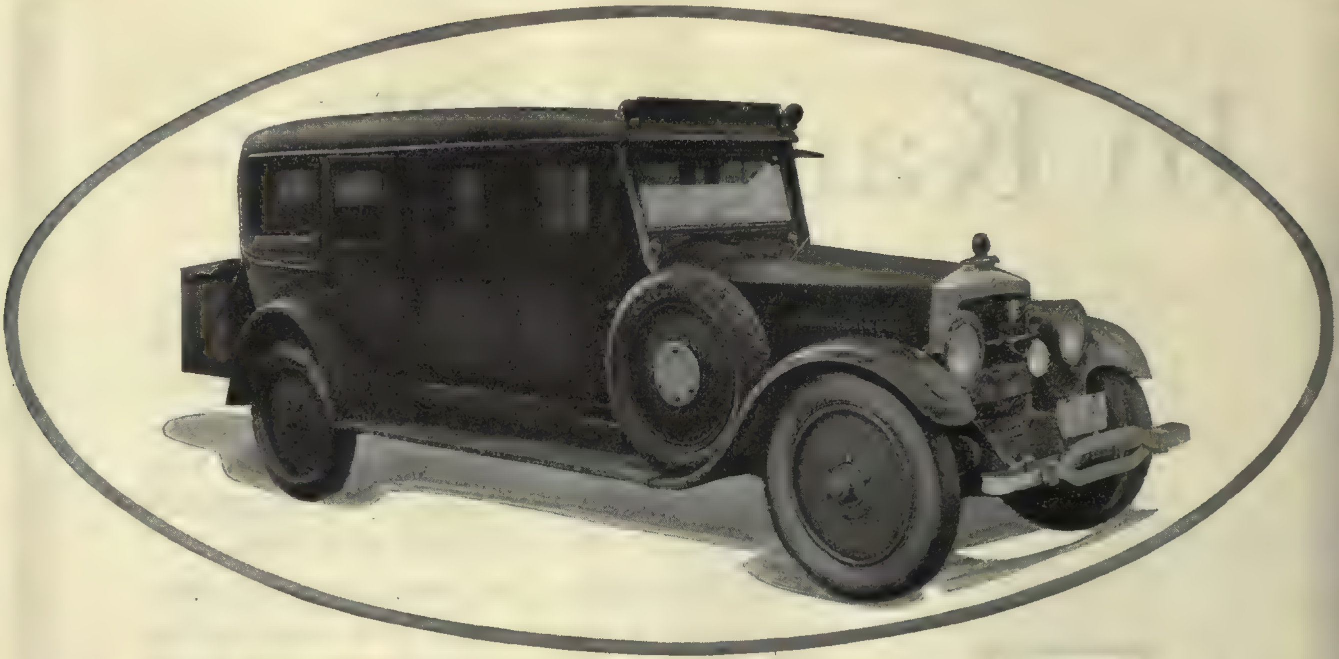
In Kansas City—

UNDER extremely difficult operating conditions—there is no route which does not have a grade of at least 5 per cent, while some of the grades are as great as 13 per cent—the Kansas City Railways Co. operates 45 motor coaches—equipped with Timken Axles, front and rear.

These vehicles are averaging 151,000 miles per month and the operating company reports "Axle service very satisfactory."

THE TIMKEN-DETROIT AXLE CO.
DETROIT, MICHIGAN

TIMKEN AXLES



108,500 miles for the bus!

51,379 to 85,134 miles for the tires!

Talk about sturdy bus tires! The set of Generals on this bus owned by W. L. Newcomer and operated between Ashland and Wellington, Ohio, has set a record that every bus operator should know about.

When this photo was taken, the bus itself had already traveled 108,500 miles. The first General Tire to wear out in this grueling grind delivered 51,379 profit-making miles before it quit. The last General to wear out had a record of 85,134 miles to its credit when it was taken off the wheel.

And between these two extremes were other Generals which had all gone more than 51,379 miles but less than 85,134 miles.

But the really remarkable thing is the record of *uninterrupted* service hung up by these Generals. One stretch of 40,000 miles was covered without a tire down for any cause!

Probably you've had some long-wearing tires yourself. But have you ever had a set of tires all of which kept going for such a distance, with so little trouble and at so low a cost per mile as the Generals on this bus of Mr. Newcomer's?

It is because The General Tire does keep going longer with less trouble and at the lowest possible cost per mile that fleet owners from one end of the country to the other are equipping their busses with Generals exclusively, and making sure of the one thing every fleet operator wants—the lowest possible cost of operation and the greatest return on the money invested in tires.

The Mark of Leading Tire Stores Everywhere

The

GENERAL
TIRE

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.

$3750
COMPLETE
(f. o. b. Detroit)

"Better Than a Private Car—"

"It's even better than individual transportation in many ways . . . ."

That is what they said of Graham Brothers Parlor Coach at Cleveland. Hundreds of street railway operators commended its attractiveness in design, finish and appointments.

A quick, quiet, safe, comfortable ride for 12 passengers. A booster of earnings in de luxe interurban service or on city runs where a preferred or express service is desired.

Operators know Graham Brothers equipment for high quality, low cost, power aplenty and service everywhere.

GRAHAM BROTHERS
Evansville — DETROIT — Stockton
A DIVISION OF DODGE BROTHERS, INC
GRAHAM BROTHERS (CANADA) LIMITED—TORONTO, ONTARIO

[*21-Passenger Street Car Type, complete, $3815, f. o. b., Detroit*]

GRAHAM BROTHERS MOTOR COACHES

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

Goodyear Balloon Tire Equipped Coach No. 214 of the Colonial Coach Lines, Watertown, N. Y.

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

Passing Another Milestone

It is Goodyear's firm purpose to advance side by side with the motor bus in its development for public usefulness and comfort.

An exceedingly important milestone in this advance has been successfully passed with the perfection of Goodyear Balloon Bus and Truck Tires.

Made with the celebrated Goodyear cord fabric SUPERTWIST, these extra elastic and extra durable tires afford the motor bus the same deep cushioning and trouble-free qualities enjoyed by the Goodyear user on his private car.

Armored with the world-familiar All-Weather Tread, they assure maximum traction and security, on any road and under any operating condition.

* * *

On the night of October 14th, 1925, the Colonial Coach Lines Company, of Watertown, New York, equipped their coach No. 214 with Goodyear Balloon Bus Tires.

In daily service, winter and summer, on the 75-mile scenic route between Watertown and Syracuse, those Goodyear Balloons rolled up an average of 37,852 miles per tire!

"They delivered every value we desired," writes Mr. H. B. Weaver, Chairman of the Colonial Coach Lines Company. "They saved us money on upkeep and repairs, materially reducing spring breakage. They provided our passengers with the last word in riding comfort, and so helped us win public good will."

* * *

The brilliant performance of Goodyear Balloon Tires in both passenger and freighting service is the result of a bus- and truck-tire development carried forward by Goodyear since the pioneer days of highway transportation.

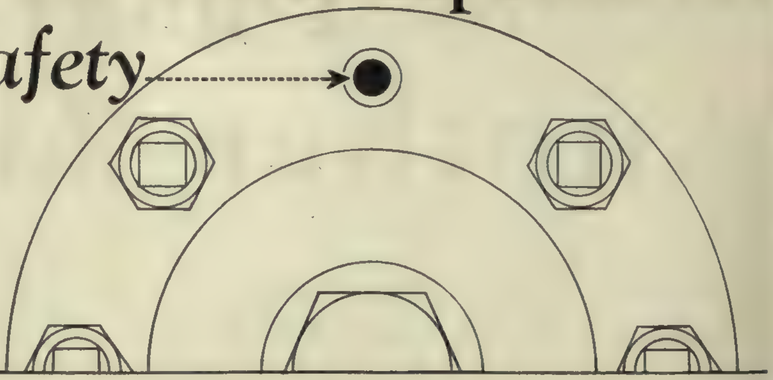
Goodyear Balloon Tires, the latest expression of that development, demonstrate superior stamina, as well as finer riding qualities, at low tire cost per mile.

More people ride on Goodyear Tires
than on any other kind

BUS TIRES

Made with SUPERTWIST

The success of your wheel depends on this *margin of safety*



This oversize hole that keeps the disc from bearing on the studs

A BUS wheel has to take a lot of punishment. If it isn't made right it gets into trouble—and the bus comes off the road.

That's why engineers built the Budd-Michelin Dual Wheel with the "margin of safety"—made the stud-holes in the disc *larger* than the studs on the hub. They countersunk these holes so that when the ball-faced cap nuts are tightened, they seat perfectly—and the cap nuts carry the wheel. That stops a lot of grief before it starts.

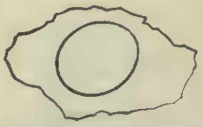
It makes it impossible for the disc to come in contact with the studs and batter the threads. With cap nuts tight there is no possibility of having the holes in the disc worn egg-shape by the studs. It makes it easy to slip the wheel on and off—and that's mighty important when a tire goes flat.

And it's mighty important when you accidently clip a curb—even a Budd-Michelin gets a bent stud from such a wallop. And if the disc fitted *snugly* over the studs, a bent stud would make it impossible to get the wheel off, or to put another wheel on!

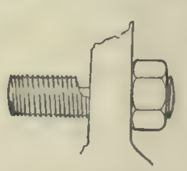
That's why Budd-Michelin Wheels have a liberal margin of space around the studs. They are made *right*—and they have proved right, on over 50 000 buses and trucks.

BUDD
WHEEL COMPANY
Detroit

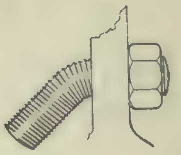
Here's what happens when the disc rides *directly* on the studs . . .



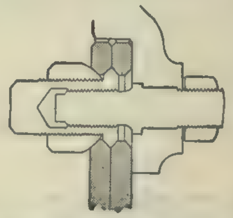
Holes in the disc worn egg-shape by the studs—causing noise.



Studs are cut off by the disc, and new studs are necessary.



Hitting a curb with force enough to bend the stud will "clinch" the disc on the hub, making it impossible to get the wheel off, or put another on.



It is difficult to pull the wheel off the hub in case tire-trouble makes it necessary to change a wheel. The threads on the studs are battered and ruined.

INTERNATIONAL HARVESTER

ABOVE: *Paul Steinbach, International de luxe coach operator of Albany, N.Y., reports an unprecedented public demand for the riding qualities and luxurious appointments of the type of coach illustrated, in the face of other keen bids for popularity.*

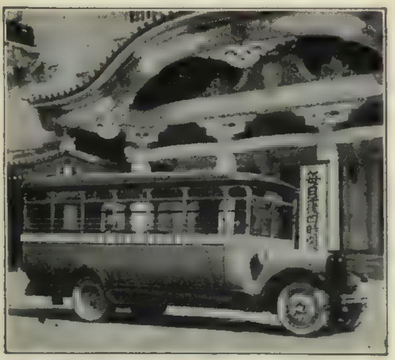
International Harvester 6-Cylinder Coaches

In forty states and twenty foreign lands the coaches of *International Harvester* manufacture are doing themselves proud. For good reasons they are depended on to carry on uninterrupted schedules, to attract and please passengers, and to keep route operation profitable. International Harvester 6-cylinder motor coaches are provided in 15 to 30 passenger capacities—Parlor-Club Coach for Cross-Country Travel, and Street Car Type for City Service—elaborately de luxe down to just plain utilitarian. Our coaches are protected by the world's largest company-owned truck and coach service organization in the world.

We have 121 direct factory branches in the United States.

Detailed information sent on request.

INTERNATIONAL HARVESTER COMPANY
OF AMERICA
(Incorporated)
606 So. Michigan Ave. Chicago, Illinois



ABOVE: *International coach on 4-cylinder underslung Model "SL" chassis at the Kabuki Theatre, Tokyo, Japan.*

BELOW: *Part of International coach fleet of the Interstate Transit Company, operating out of Omaha, Sioux City, and other cities.*

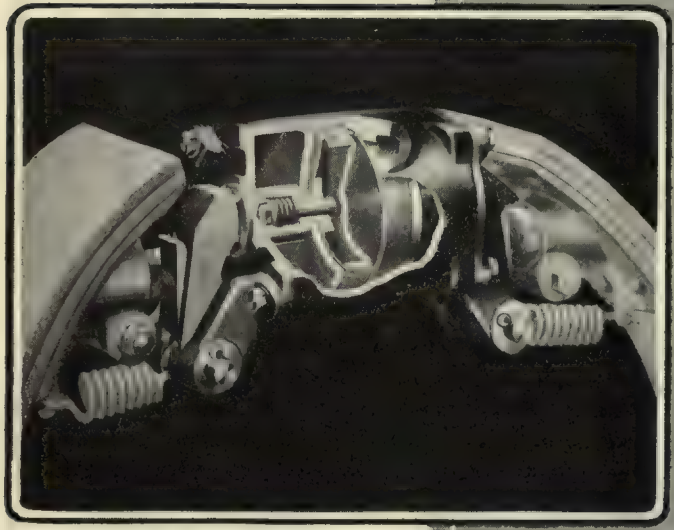
INTERNATIONAL HARVESTER

Brakes!

THERE'S a considerable difference, you know. What we mean is brakes that *are* brakes, that hold the bus with unfailing certainty and require so little attention that brake maintenance is negligible.

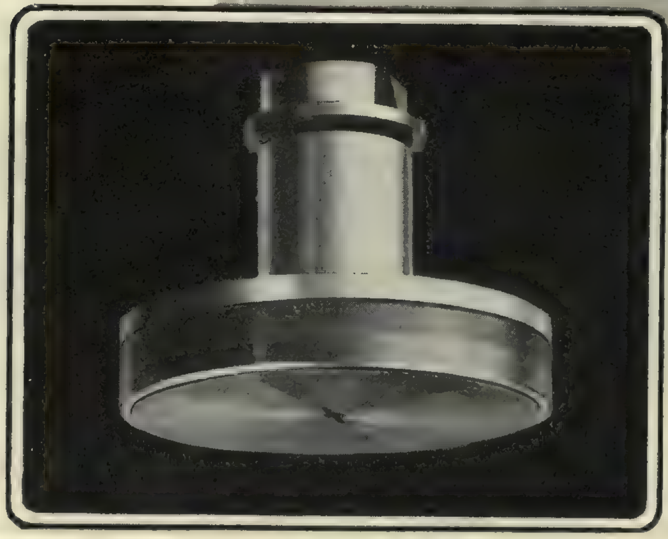
At the Show last week you probably saw the exhibit of Christensen Air Brakes in operation and saw how simple they are. Complications have been boiled out of the braking system throughout. The compressor drive is direct from an eccentric on the engine crankshaft. There are no gears, chains, belts, auxiliary shafts, or universals to cause drive trouble. The drive is *direct*.

The brake is operated without the usual pull-rods, levers, cams, universals, and "equalizers." A cylinder inside the brake drum, with two opposed pistons transmitting power to the brake shoes, does the job. The pistons are



Sectional view of Christensen Brake Cylinder showing Sealtite all-metal pistons and 2 to 1 power levers.

Christensen Ai
6513 Cedar Av



Sealtite all-metal brake piston assembled.

Christensen Air Brakes on Safeway Six Wheel Bus showing rigid shoe construction and 2 to 1 power levers. In the service of the Cleveland Railway Co.

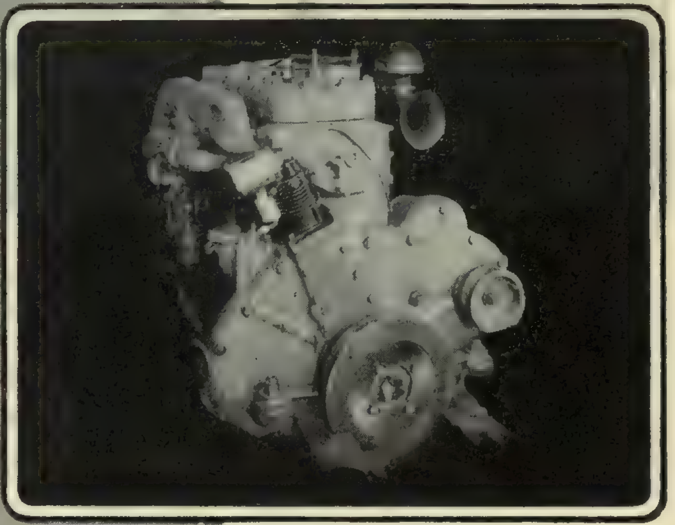
ot only in name,
ut in fact

Sealtite all-metal, which produces a perfect air seal and is unaffected by brake heat and oil vapor.

Since the Sealtite pistons are practically wear proof, the travel of the pistons in the cylinders is sufficient to entirely wear out the brake liner, and the design is inherently self-equalizing, the only limit to attention-free life of the brakes on a Christensen equipped bus is the life of the brake liner.

When you buy your next buses remember that *Christensen Air Brakes require no adjustment from the time the brakes are originally set up until the liners are worn out.*

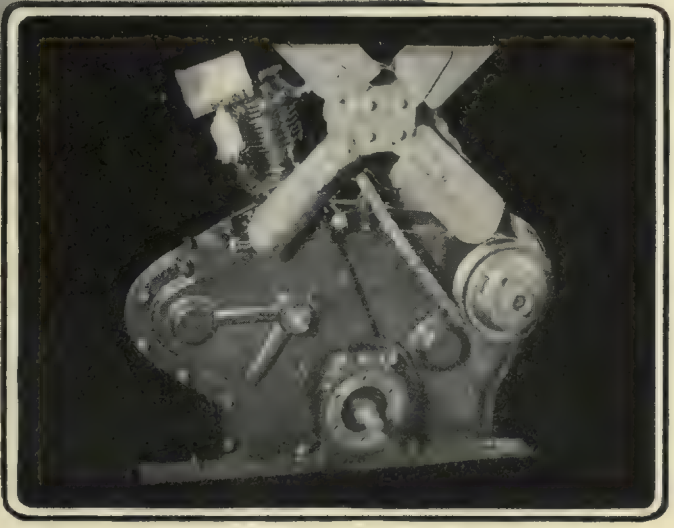
Specify "Christensen Air Brakes" and you will have accomplished at least two things—an important reduction in brake maintenance expense, and the assurance that your buses have *brakes, real brakes.*



Christensen Compressor and governor mounted on front end gear case cover plate of Continental 14H engine, driven direct from an eccentric on engine crankshaft. Installed on Six-Wheel Double-Decker used by Cleveland Railway Co.

rake Company
leveland, Ohio

Christensen Compressor and governor mounted on front end gear case cover plate of Buda model GL6 engine, driven direct from an eccentric on engine crankshaft.



DID you see the interesting exhibit of new bus bodies at the A E R A Cleveland Convention?

These included a 21 passenger City Pay-enter type, a 29 passenger combination Pay-enter and Parlor Coach type, and a 29 passenger De Luxe Parlor Coach type.

We build all types of high grade bus bodies. This full line of body equipment includes many new and desirable features and the experience in building fine bodies for 73 years.

We are prepared to offer a complete designing, manufacturing and sales service to the bus industry which cannot be duplicated by small organizations lacking our wide experience and unusual building and engineering facilities.

May we advise with you on your bus requirements?

THE BAKER-RAULANG COMPANY · *Bus Body Division* · CLEVELAND, OHIO

Baker
Raulang
TRADE MARK
Bus Bodies

Section of Firestone Gum-Dipping Units with one tower cut away to show interior.

One of the outstanding developments by Firestone Research Engineers is the process of dipping the cords in a rubber solution which impregnates and insulates every fiber of every cord. This adds strength to the cords and reduces to a minimum internal friction and heat so destructive to tire life.

The Gum-Dipping of the cords made it possible for Firestone to develop the Gum-Dipped Bus Pneumatic which gives to motor buses not only extra riding comfort and safety but a definite dollars-and-cents saving in increased mileage.

In the battle of tires on race tracks—in the day-in and day-out service of the largest truck, bus and taxicab fleets—on the cars of hundreds of thousands of motorists everywhere—Gum-Dipping has demonstrated its supremacy in greater economy, safety and comfort.

Do not deny the patrons of your bus line these advantages. Equip with Firestone Gum-Dipped Bus Pneumatics. They are built as only Firestone can build them and will perform as only Gum-Dipped tires can perform. See the nearest Firestone Dealer.

The Mark of Quality

MOST MILES PER DOLLAR

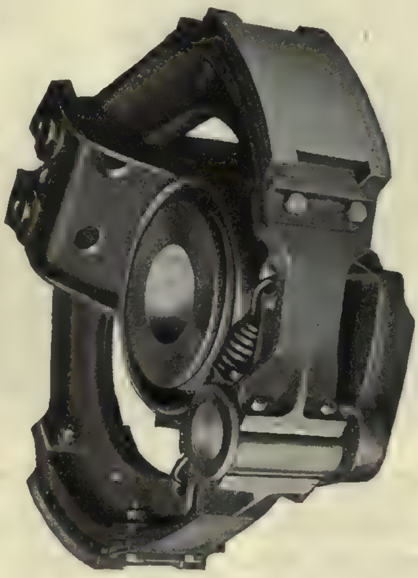
AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . Harvey S. Firestone

THE AMERICAN BRAKE SHOE & FOUNDRY CO.

at the American Electric Railway Association
Convention, announced its new subsidiary, the

AMERICAN BRAKE MATERIALS CORPORATION

and exhibited its product



—AMERICAN— BRAKEBLOKS

A NEW FRICTION-ELEMENT FOR BUS AND OTHER AUTOMOTIVE VEHICLES

This new automotive braking material has the following important features:

1—Friction equals that of any new fabric liner—will remain constant throughout the entire life of the material.

2—Greater cooling area—less than 1/3 of the area of drum is covered with BRAKEBLOKS, leaving a larger radiation area to dissipate heat.

3—Durability—far in excess of fabric liners.

4—Drums—no cutting or scoring—BRAKEBLOKS have no metallic content.

5—Labor costs—BRAKEBLOKS may be renewed without removing brake shoe from the assembly.

6—Attachment—no riveting.

7—Unaffected by water, oil or grease.

8—Will not burn, smoke or squeal.

9—Will not grab.

If you had no opportunity to see the AMERICAN BRAKEBLOKS exhibit at the Convention we will be pleased to furnish detailed illustrated information upon request.

AMERICAN BRAKE MATERIALS CORPORATION
30 Church Street, New York City

Can You Smile Over Electrical Equipment Maintenance Reports ?

You can if your buses are equipped with Leece-Neville Patented Voltage Regulated Electrical Equipment—starting and lighting.

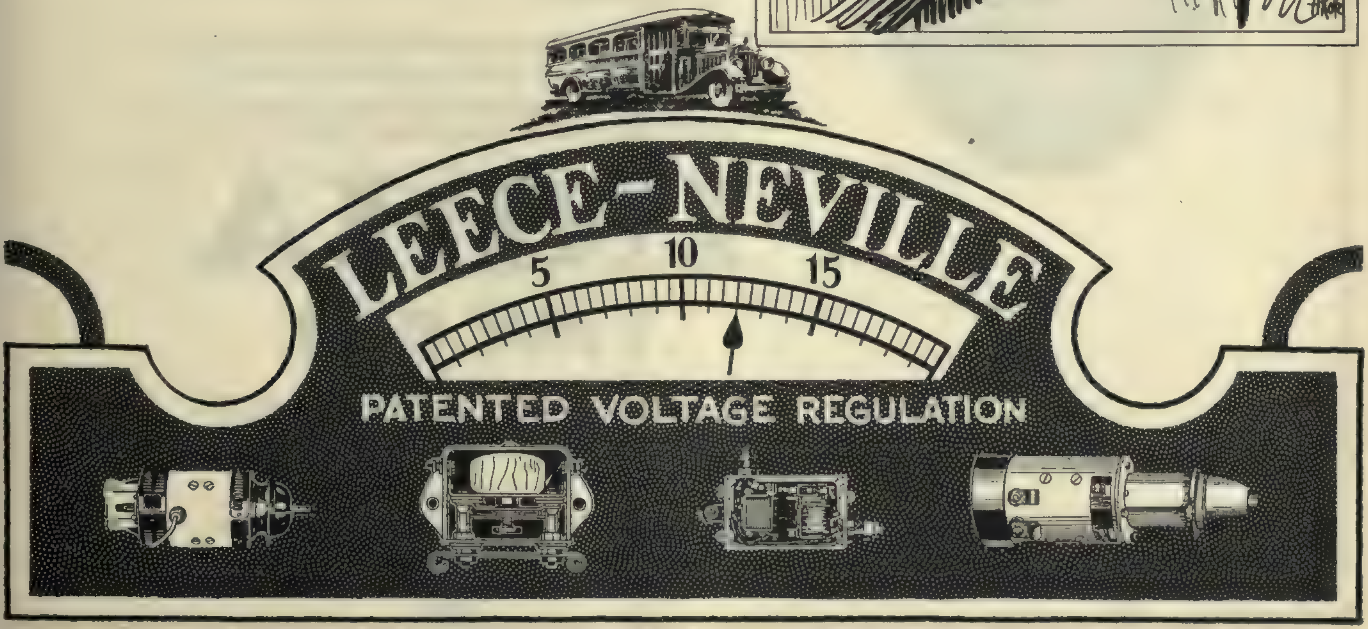
Maintenance on the equipment itself is minimum. Leece-Neville Voltage Regulation absolutely prevents overcharging of battery, and reduces the probability of it remaining undercharged. Experience shows that batteries last four or five times as long if Leece-Neville Patented Equipment is in use.

Leece-Neville Voltage Regulation insures steady and constant lights, an important factor in night operation.

All good bus makers either install this equipment, or provide for its optional installation.

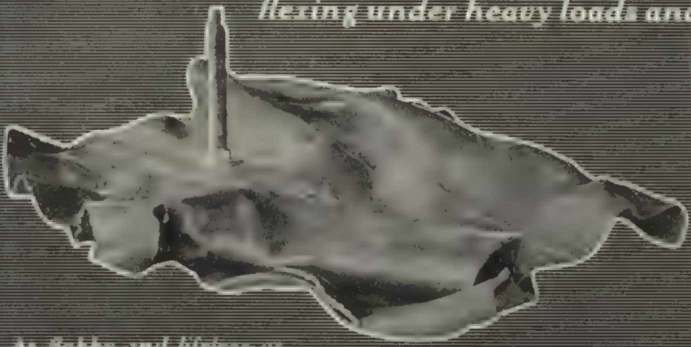
Get a Leece-Neville Service Book. It will tell you of a nearby service station where you may have this equipment explained to you.

LEECE-NEVILLE COMPANY
Cleveland, Ohio

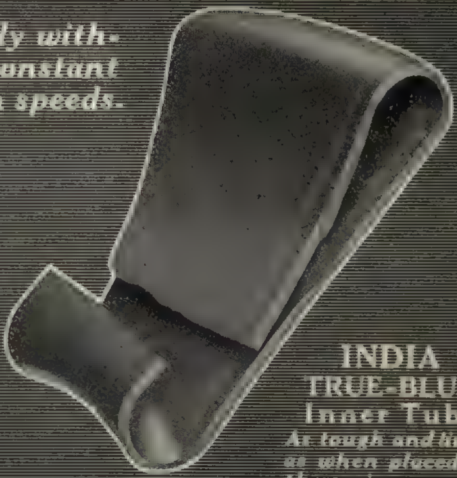


INDIA TRUE BLUE [HEAT PROOF] INNER TUBE

The first inner tube to successfully withstand the "burning-up" from constant flexing under heavy loads and high speeds.



As flabby and lifeless as old rotted leather. Easily torn with the hands.



INDIA
TRUE-BLUE
Inner Tube

As tough and lively as when placed in the casing.

This actual service test again proves the striking superiority of the TRUE-BLUE (HEAT-PROOF) inner tube under present high-speed, low-pressure, heavy load running conditions.

A new TRUE-BLUE tube and a new heavy red tube of standard make and equal price were placed, at the same time, on one of the buses of an important California bus line. When the red tube "blew out" they were both removed. The effects of this equal service on the two tubes are shown above.

Service tests like this combined with the standard laboratory aging tests, prove TRUE-BLUE tubes to be truly heat-proof—and by long odds the greatest improvement that has been made in inner tubes in recent years.

This is one of many exclusive INDIA features which enable car owners, bus and truck operators to get unusual records of *uninterrupted* mileage from INDIA tires.

INDIA
TRUE BLUE
HEAT PROOF
INNER TUBES

Get IndiaWise

INDIA TIRES

INDIA TIRE & RUBBER CO., AKRON, OHIO.

One of the various types of cars exhibited at A.E.R.A. Convention. Built for the Jamestown Street Railway Co., Jamestown, N. Y.

A double-end city car built for Johnstown Traction Co., Johnstown, Pa., a sixty-one foot high speed interurban built for the Union Traction Co., Anderson, Ind., and a steel parlor car built for Indiana Service Corporation of Fort Wayne were also shown.

Quality Cars

ELECTRIC Railways continue to be the mainstay of mass transportation.

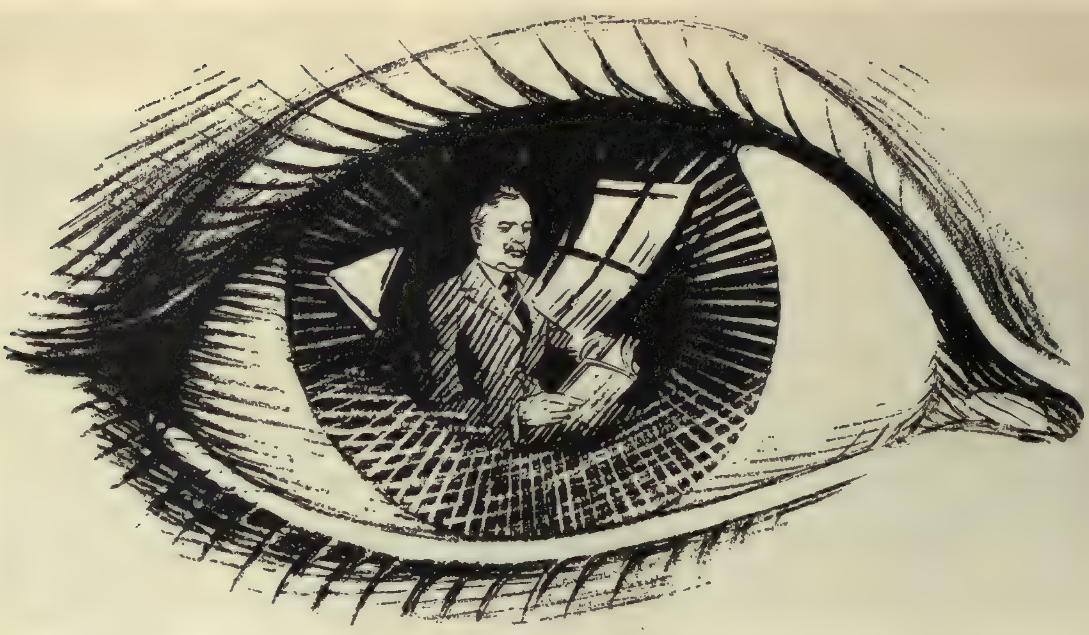
Electric Railways that have become increasingly attractive to investors are those that have taken steps to be more *attractive* to the passengers.

NEW MODERN CARS PAY

St. Louis Car Company

St. Louis, Mo.

"The Birthplace of the Safety Car"



A trained eye with flawless vision

Continual developments and improvements in your field or branch of industry demand an ever-watchful eye to keep abreast of the leaders. You cannot afford to overlook a single opportunity whether it be a new product, a new method of manufacture or a change in market conditions.

A personal investigation of the ever-changing conditions is a task no individual can attempt, —one that no manufacturer can accomplish successfully.

You require a special organ, a business eye—one that has perfect, undistorted vision, trained for its particular work.

This A. B. P. paper is such an organ. It was created by the needs of its field and owes its success to the service which it renders.

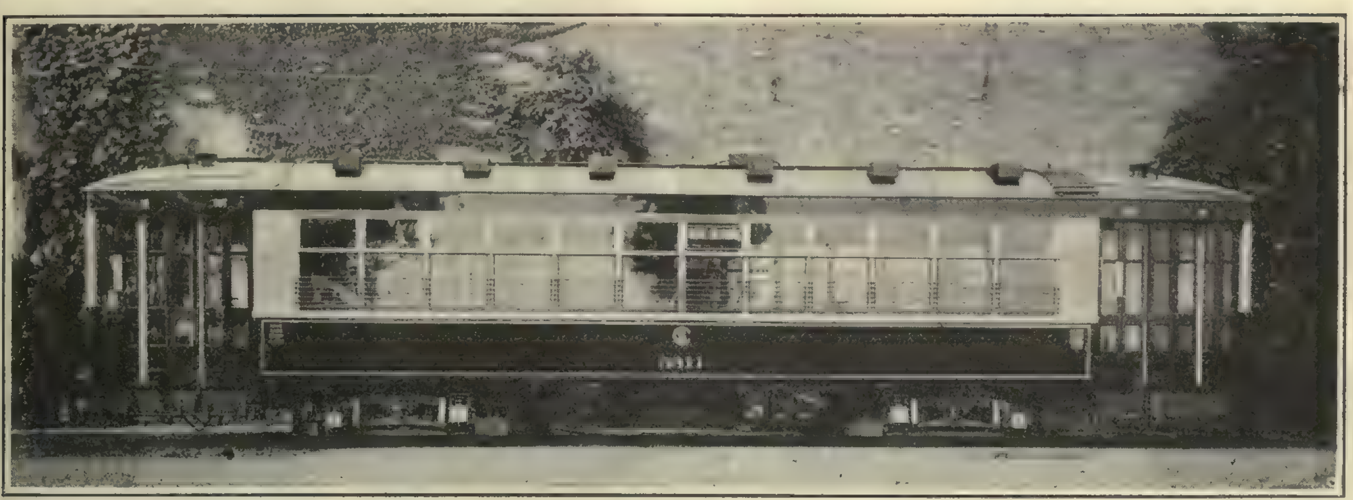
In its pages you will find the latest news, the trend of contemporary thought and practice. Whether it be an editorial or an advertisement you can depend on the truthfulness of its statements, for it is pledged to maintain the highest standards of publishing practice.

A. B. P.

THE ASSOCIATED BUSINESS PAPERS, Inc.
Executive Offices: 220 West 42nd St., New York, N. Y.

An association of none but qualified publications reaching the principal fields of trade and industry.

Electric Railway Journal is a member of The A. B. P.



Thirty-Four New Cars of this type, built in the Cummings shops, now being delivered to Chicago Surface Lines

"There's no substitute for street railway service!"

So says a recent newspaper advertisement of a prominent railway company

Of all modes of transportation now available to the public, electric railways retain the largest share of patronage and are recognized by the public as an essential element in modern life.

The railways are more aware of this today than ever before. The new equipment being offered for the use of the public today is much superior to that which it replaces.

Cars recently shipped by this company to several Railway Companies express the new trend to a marked degree. Let us consult with you when new equipment is in prospect.

CUMMINGS CAR AND COACH CO.
Successor to McGuire-Cummings Mfg. Co.
111 W. Monroe St.
CHICAGO

Depend on

Before you buy a truck or a bus see the Whites at any of our 80 factory branches or 500 dealers. There is a White Model to meet every transportation need.

Truck Chassis

Model 15	— ¾-Ton	$2,150
Model 20	—2 -Ton	2,950
Model 51	—2½-Ton	3,750
Model 40-A	—3½-Ton	4,350
Model 52	—Heavy Duty	5,100

(Several types of power dumping bodies and hoists available.)

Bus Chassis

Model 53	—16 to 21 pass.	$4,250
Model 50-B	—25 to 29 pass.	5,350

All prices f. o. b. Cleveland

"We wanted a bus that was safe, durable, dependable, and the kind of bus the public would want to ride in. It had to be economical from an operating standpoint. Our White busses have been very satisfactory and the service rendered by The White Company has been excellent. They meet our requirements and are more profitable than the cars they replaced."

(Signed) HARRY H. HANSON,
Vice-President and General Manager
Middlesex and Boston Street Railway Co.
Newtonville, Mass.

WHITE

WHITES

Middlesex and Boston Street Railway Co. depend on White Busses to deliver 100,000 bus miles per month - - - and with Whites every mile is a money-earning mile

Connecting with Boston elevated lines and operating in and between 17 surrounding towns is the heavy schedule maintained by the Middlesex and Boston fleet of White Busses.

Bus operation was started in August, 1924, with 10 White Model 50-A 25-passenger busses. Since that time new Whites have been steadily added as service was extended, until today, this company has 44 White Busses in service and 18 on order.

White Busses were originally selected because of the record Whites have everywhere for delivering dependable and profitable transportation to bus operators.

White Busses in the Middlesex and Boston fleet are operated in all classes of service, including feeder, supplemental and charter—in substitution for former car service over the same routes where car service has been abandoned.

The public is better served, the operation is more profitable and the savings are typical of the unfailing ability of Whites to earn money in service.

White Busses will give you what the thousands of White operators have learned to expect from a White—the most money-earning miles.

THE WHITE COMPANY
CLEVELAND

BUSSES

Note the Table of Contents

110 pages of bearing data, recommendations and *knowledge*, based upon experience with 160,000,000 successfully applied bearings! That's the new Timken Engineering Journal, complete with figures and facts which are governing the adoption of Timken Bearings for every type of mechanical device, throughout industry.

New curves of endurance, output, and economy are being charted by means of Timken tapered design, Timken *POSITIVELY ALIGNED ROLLS*, and Timken-made steel, among the many Timken features. The Timken Engineering Journal tells exactly *why* and *how*. Your request on your letterhead brings your copy.

THE TIMKEN ROLLER BEARING CO., CANTON, O.

Technical information regarding bearing sizes and their mountings can be secured from the Timken Roller Bearing Service & Sales Company's Branches located in the following cities: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, Memphis, Milwaukee, Minneapolis, Newark, New York, Omaha, Philadelphia, Pittsburgh, Richmond, St. Louis, San Francisco, Seattle, Toronto, Winnipeg.

TIMKEN
ENGINEERING JOURNAL

Containing Information Relative to the

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100 · YEARS · OF · MANUFACTURING · EXPERIENCE ·

Cane
Webbing
For Car Seats

No. 327-M

BETTER SEATS FOR BETTER BUSINESS

The public demands more comfortable seats, whether in new or old cars. Seat No. 327-M is an example of how Heywood-Wakefield has met this need by combining luxurious comfort with sturdy quality. It has a spring back and seat cushions, easy posture and a fine appearance.

There are H-W seat types for every kind of service. Let our passenger seating experts help select the best type for you.

Heywood-Wakefield
REG. U.S. PAT. OFF.

HEYWOOD-WAKEFIELD SALES OFFICES
Heywood-Wakefield Company, Wakefield. Mass.

Heywood-Wakefield Company,
516 West 34th St., New York, N. Y.

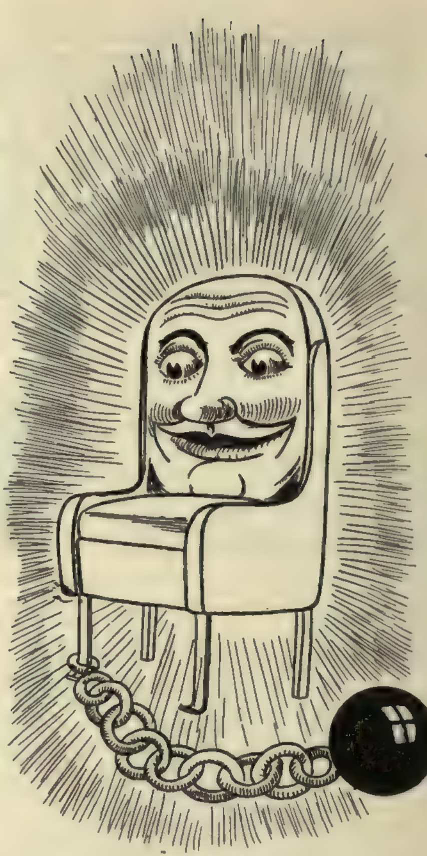
Herbert G. Cook,
Hobart Bldg., San Francisco, Cal.

The G. F. Cotter Supply Co.,
Houston, Texas

Heywood-Wakefield Company,
439 Railway Exchange Bldg., Chicago, Ill.

Frank N. Grigg,
630 Louisiana Ave., Washington, D. C.

Railway & Power Engineering Corporation,
133 Eastern Ave., Toronto;
Montreal; Winnipeg, Canada



Sentenced

to Sunday clothes for life

Those who equip their car seats with real leather upholstery sentence them to Sunday clothes for life, for there is nothing like leather for keeping up the best possible interior appearance throughout the life of the car.

Hyaline (The Finest Coach Leather Obtainable) and our many other grades of fine leather in several finishes are available to dress your cars up in Sunday clothes. Only one suit is necessary for the leather of the Cleveland Tanning Company outlasts any other covering.

We offer complete hides or will cut them to pattern. Booklets containing samples and description of our many grades and finishes gladly sent upon request.

The Cleveland Tanning Co.

Dennison Ave. and Jennings Road, Cleveland, Ohio

Western Representatives:
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Chicago

Eastern Representatives:
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New York City

HYALINE

The Finest Coach Leather Obtainable

Co-Ordination

"OHIO POWER COMPANY
DEVELOPS OWN BUS"

"The compressor used with this braking system also furnishes the air for operating the automatic bus doors. The front axle is a Shuler,"

"The Front Axle Is a Shuler"

The above excerpt taken from article that appeared in Automotive Industries, August 12 issue, describing major units used in the specially designed bus manufactured by the Northern Ohio Power & Light Co.

Shuler
Front
Axles

For: MOTOR BUSSES

Shuler Axle Company
Incorporated
Louisville, Ky.
Member of Motor Truck Industries Inc., of America

All along the line in every type of service —urban, suburban, interurban—and bus

Type 15A

From the great electric railway systems serving the large cities, to the small ones serving villages, Hale-Kilburn Seats are all-important factors in selling the service to the public.

Their correct design assures comfortable riding even on the longest trips. Their simple, sturdy construction assures long wear even under the severest operating conditions.

Types and styles range from the most luxurious plush creations to the most inexpensive rattan seats.

Write for catalogs and estimates.

HALE-KILBURN COMPANY

General Offices and Works: **1800 Lehigh Avenue, Philadelphia**

SALES OFFICES:

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Hale-Kilburn Co., McCormick Bldg., Chicago
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Chris Eccles, 320 S. San Pedro St., Los Angeles
T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
W. D. Jenkins, Carter Bldg., Houston, Texas
H. M. Euler, 46 Front St., Portland, Oregon

Type 300A

Type 900A

To co-ordinate comfort on cars and buses

H-K Seats for cars and buses

Type 15A—Luxurious plush covered revolving chair for the finest type of interurban cars.

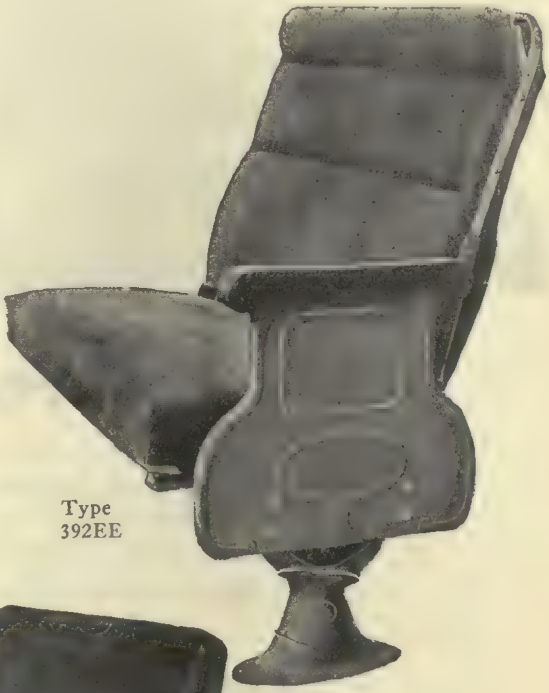
Type 300A—Thoroughly practical rattan car seat for hard city service.

Type 900A—Well-designed, comfortable double chair for buses.

Type 208—De Luxe bus seat with leather or high-grade imitation as specified.

Type 199F—Special—Inexpensive but comfortable seat for suburban and light-weight interurban cars.

ype 392EE—Finest type of interurban car seat with extra high three part head-roll.



Type
392EE

Type
208

Type
199F
Special

Hale and Kilburn SEATS

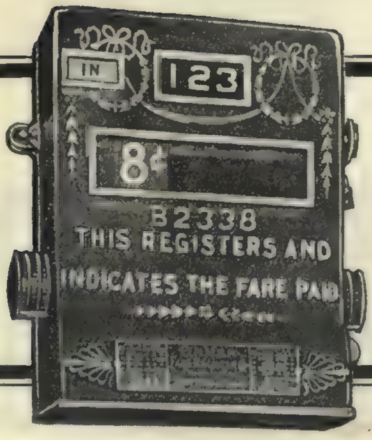
Transportation Accounting

An Ohmer Fare Register in an electric railway car or a motorbus records each sale of transportation more accurately, more quickly and more permanently than could an expert accountant stationed at a desk at the point where the sale is made.

The Ohmer Fare Register is a mechanical accountant which plainly indicates the amount and the class of the fare paid and records it in the form of a condensed detailed printed report which remains forever a permanent record of the day's business.

Ohmer Fare Registers are made in many types and sizes with capacities for recording any possible cash or ticket denomination and with operating equipments adapted to all types of cars and buses.

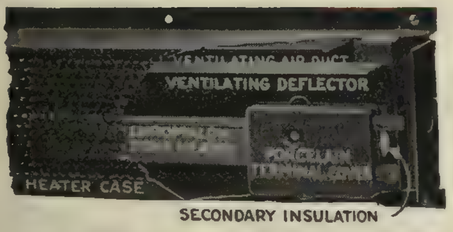
Ohmer Fare Register Company
Dayton, Ohio, U. S. A.



OHMER
REG. U.S. PAT. OFF.
FARE REGISTERS

When You Order New Cars or Rebuild Old Cars—Specify

UTILITY

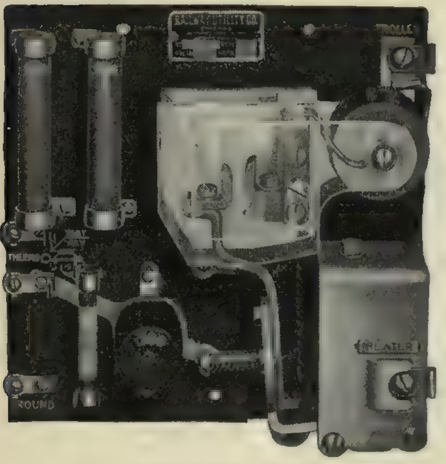


1500 VOLT TRUSS PLANK SERIES HEATER

ELECTRIC HEATERS

Fitted with *Chromalox* strips. Approved by Underwriters' Laboratories for Label Service

MORE THAN 42,000 IN SERVICE RENDERING SPLENDID RESULTS



REGULATOR PANEL

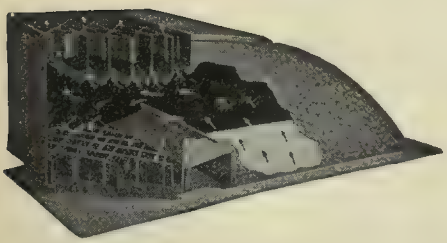
UTILITY HEATING SYSTEMS

are regulated so that they *economically* render *heat* in the *proper amount*

Over 25,000 electric cars are equipped with UTILITY THERMOMETER CONTROL so as to secure heat by electricity without excessive cost.

Electric Heat Properly Produced and Regulated is not only BETTER, but is more ECONOMICAL than stove or hot water heat.

Proper Heating Requires Proper Ventilation



THE POWERFUL HONEYCOMB VENTILATOR

The Utility Compensating System, consisting of a Combination of the powerful Utility Honeycomb Exhaust Ventilators, and the Utility Compensating Intake Ventilators, which provide the proper or essential amount of clean air intake, is without question the best on the market.

Car Comfort
with
Utility
Heaters
Regulators
Ventilators

RAILWAY UTILITY COMPANY

CHICAGO, ILLINOIS

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R. R. HOLDEN, Straus Bldg., Chicago
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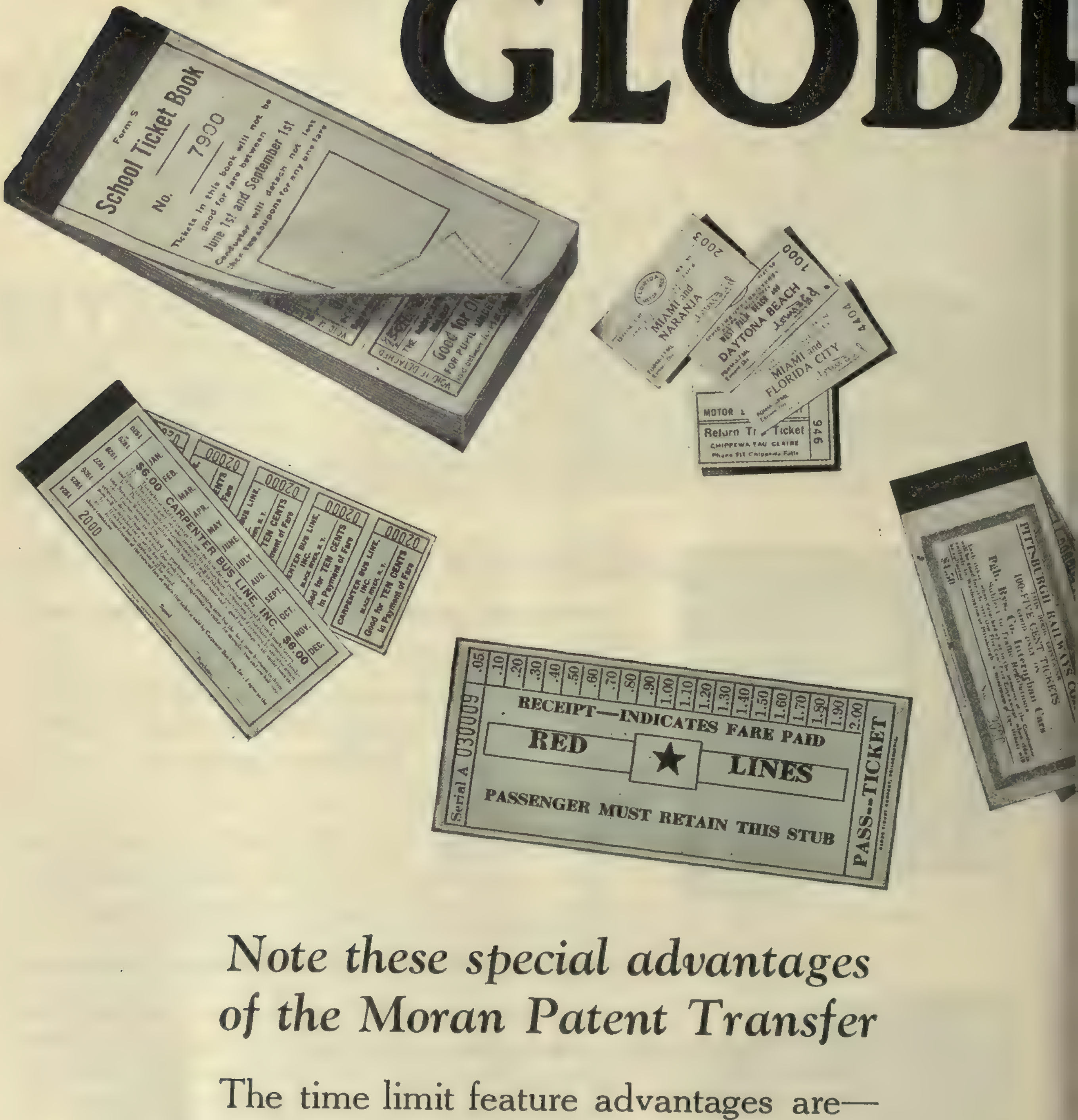
F. O. GRAYSON, La Salle Bldg., St. Louis
E. J. HUNT, Equity Bldg., Detroit
O. W. MEISSNER, 275 Craig St. W., Montreal

Car Comfort
with
Utility
Heaters
Regulators
Ventilators

GLOB


Form's
School Ticket Book
No. 7900
Tickets in this book will not be good for fare between June 1st and September 1st
MIAMI and NARANJA
DAYTONA BEACH
MIAMI and FLORIDA CITY
Return Ticket
CHIPPEWA FAU CLAIRE
$6.00 CARPENTER BUS LINE, INC. $6.00
CARPENTER BUS LINE, INC.
Good for TEN CENTS in Payment of Fare
RECEIPT—INDICATES FARE PAID
RED LINES
PASSENGER MUST RETAIN THIS STUB
PASS—TICKET
Serial A U30009
PITTSBURGH RAILWAYS CO.

Note these special advantages of the Moran Patent Transfer

The time limit feature advantages are—no punching, expired limit shown by length of ticket; no possibility of confusing A.M. and P.M., when contrasting colors are used for each.

TICKETS

They make the collections easier, speedier, more accurate—

Globe Tickets, Transfers and Passes are designed for all standard and special requirements.

We have specialized in this work for over 50 years.

Accurate numbering, high quality printing on good tough stock, protection against counterfeiting, satisfactory perforation, and *delivery on time* are the results of our experience and service.

Tell us your ticket troubles. Perhaps we can solve them.

GLOBE TICKET COMPANY

New York Philadelphia Los Angeles San Francisco

Specialists in Tickets and Checks Since 1873

BUS TRANSPORTATION COMPANY OF WHEELING
GLOBE TICKET COMPANY, PHILA., PA.
12 NOON
11 AM
10 AM
9 AM
8 AM
SEE OTHER SIDE FOR CONDITIONS OF USE OF THIS TRANSFER TICKET

The Graybar Tag, under which 60,000 electrical supplies are shipped

Tamed!

—*a victory that saves money for the nation's business*

In distributing electrical supplies Graybar Electric (formerly the Western Electric Supply Department) has been a consistent geography tamer, working to reduce the cost of getting supplies to the user, be he near or far away.

There are fifty-nine Graybar distributing houses located at strategic points of distribution. The demands of this nation-wide chain keep manufacturers busy, permit of quantity purchases and make it possible for the manufacturer to produce, and the consumer to buy, quality electrical supplies at fair prices.

Fifty-six years as the Supply Department of the Western Electric Company have given the wisdom of age in judging character in goods distributed. As the Graybar Electric Company there has been added to that wisdom the zeal of youth to serve.

Offices in 59 Principal Cities
Executive Offices: 100 East 42nd St., New York

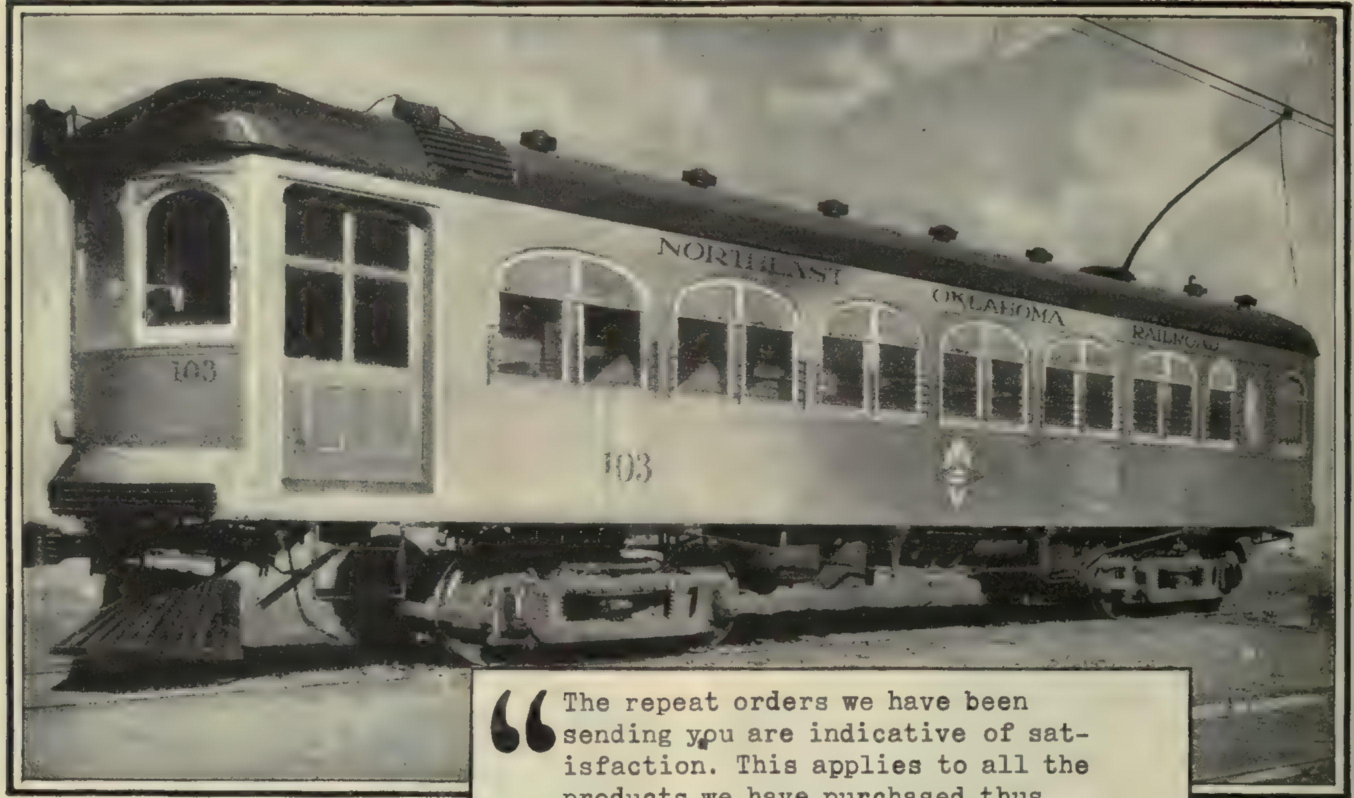
CAREFULLY INSPECTED—ALWAYS UNIFORM

SPIKES-BOLTS

The Illinois Steel Company enjoys the regular bolt and spike business of many of the best known railroad purchasing officials in the country largely because these officials appreciate the value of absolute *dependability*—the sort of dependability only ample manufacturing facilities and long railroad experience can guarantee.

We are, as always, at your command.

Illinois Steel Company
General Offices: 208 South La Salle Street
Chicago, Illinois



"The repeat orders we have been sending you are indicative of satisfaction. This applies to all the products we have purchased thus far and we unreservedly commend to others the Valentine products as being the 'Standard of Quality.'"

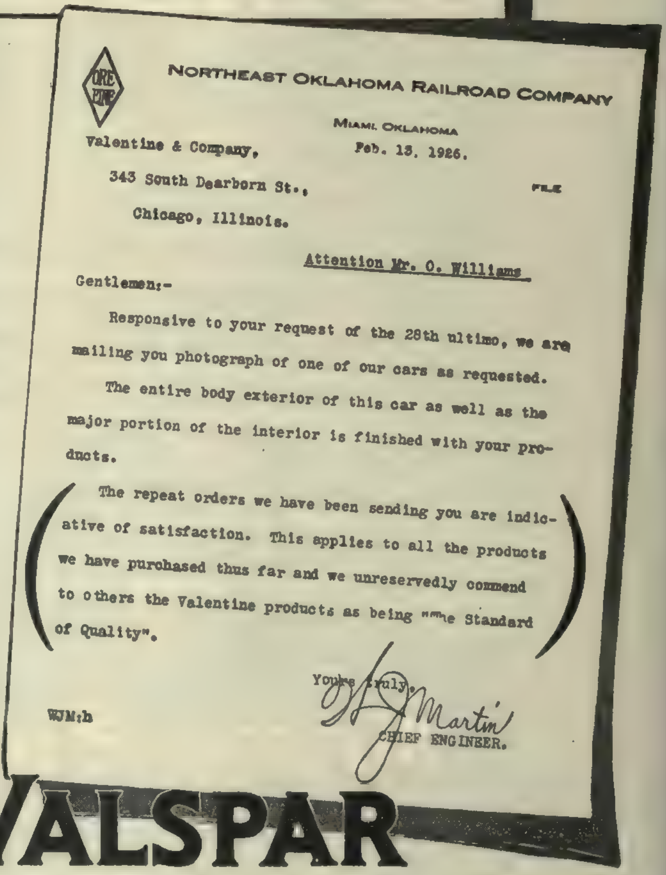
When they come back for more!

Throwing bouquets is one thing—but when customers come back for more and keep coming, you can rest assured they're well *satisfied.*

Valentine customers have been "coming back" for nearly a century. That's why they refer to Valentine finishes as "The Standard of Quality" by which other finishes are judged.

Nitro-Valspar is the finish used on the car of the Northeast Oklahoma Railroad Company shown above. This remarkable lacquer finish is not just a top coat, as most lacquers are, but a complete lacquer system from primer to final finishing coat.

All coats of the Nitro-Valspar system can be applied in two days or less, and what's more, no finish you can buy today is so durable!



NORTHEAST OKLAHOMA RAILROAD COMPANY

MIAMI, OKLAHOMA

Valentine & Company,
343 South Dearborn St.,
Chicago, Illinois.

Feb. 13, 1926.

FILE

Attention Mr. O. Williams

Gentlemen:-

Responsive to your request of the 28th ultimo, we are mailing you photograph of one of our cars as requested.

The entire body exterior of this car as well as the major portion of the interior is finished with your products.

(The repeat orders we have been sending you are indicative of satisfaction. This applies to all the products we have purchased thus far and we unreservedly commend to others the Valentine products as being "The Standard of Quality".)

Yours truly,

Martin
CHIEF ENGINEER.

WJM:b

NITRO-VALSPAR

VALENTINE & COMPANY

New York *Chicago* *Boston* *W. P. Fuller & Co., Pacific Coast*

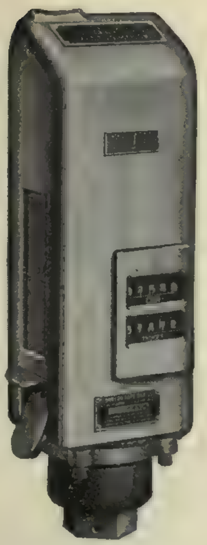
Who knows most?

Electro-magnet type of fare box—NOT motor driven; no drain on battery.

Who can best solve your problem about fare collections?

We think our engineers can—and here's why:

Johnson has evolved satisfactory fare collection systems for the majority of city and interurban cars running today—as well as for bus lines.



Full automatic fare box

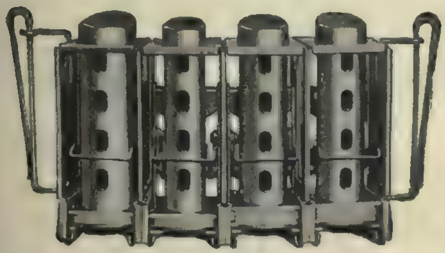
Our wealth of experience is ready to help you. Address Dept. 44 at the home office, please.

Johnson Fare Box Co.

4619 Ravenswood Avenue
CHICAGO

2 W. 61st Street, NEW YORK

Ever see our coin changer? Built right—a quality product, built the Johnson way throughout. Men like 'em—they don't stick or spill. Ask for folder on coin changers and how to use them.



Give this coupon to your secretary and let her write for the facts about the Johnson 99 9/10%-perfect fare collec-system, now sold on the Pay-As-You-Use plan.

Hubbard Distribution

—an important part of Hubbard Service

Unparalleled manufacturing facilities in four factories—the largest of their kind in the world—represent only a part of Hubbard Service. Another all-important factor is Hubbard Distribution, which is handled by

124 responsible jobbers

Strategically located throughout the country, these 124 jobbers carry complete stocks of Hubbard Pole Line Hardware and Peirce construction Specialties.

Because of this exceptional combination of manufacturing and distributing service you can meet your every requirement by using the Hubbard Catalog—the concentrated buying guide of the electric railway industry.

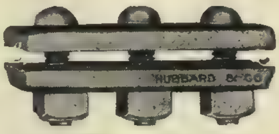
Write to your nearest jobber or to us for your copy of our Catalog 24.

Split Pole Bands

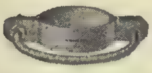
Peirce Forged Steel Pins

Peirce Pins

Hubbard Turnbuckles



Hubbard Heavy Rolled Steel Guy Clamps



Hubbard Pole Bands With Pull-off Rods

HUBBARD CATALOG
A COMPLETE LISTING OF HUBBARD POLE LINE HARDWARE AND PEIRCE CONSTRUCTION SPECIALTIES

HUBBARD

Hubbard and COMPANY

PITTSBURGH ❧ OAKLAND, CAL. ❧ CHICAGO

Enduring—

Quality Ties
Ready for Shipment
Now

Life Insured Car Tracks

IT'S a pretty serious matter, costly as well as annoying, when a busy street has to be dug up for track renewal. That's why it pays to use ties which will last as long as the rail itself.

International Creosoted Ties, of carefully selected timber, thoroughly impregnated, are averaging twenty years' life on heavy traffic railroads. Compared with untreated wooden ties, the cost is only slightly more and the life is several times as great.

With ***International*** Creosoted Ties, you gain all the advantages of wood, resiliency, noiselessness and easy replacement, while avoiding the rigidity and high cost of mechanical substitutes. It's track life insurance at nominal cost.

We are making shipments at attractive prices to all points in the United States. Get our quotations.

Let us quote you on your requirements.

International Creosoting & Construction Co.
General Office—Galveston, Texas

International HIGH GRADE CREOSOTED TIES

Where passenger preferenc

Passenger preference favors quietness in vehicles these days. Modern automobiles are practically noiseless. Modern motor coaches are cushioned and silenced to the standard of the automobile. And modern electric railway cars are rapidly developing along the same lines.

Nuttall

NEW

TAPERED ROLLER BEARING

TROLLEY BASE

Form U.S. 20-A

Nuttall
Trolley Bases,
Wheels, Harps, Poles,
Nuttall Pantagraphs

Detailed description bulletins of any or all Nuttall Electric Railway Specialties gladly sent on request.

Write us.

ecomes sound operating economy

NUTTALL
Standard Helical Gears

One of the most important factors contributing to the production of a really quiet electric railway car has been the perfection of the Nuttall Helical Gear for this service. The meshing of the teeth is like the turning of a screw,— a smooth rolling contact that delivers full power without noise, without shock and with a minimum of wear. There is no grinding and no chattering. Helical geared cars are quiet cars,— easy riding passenger-attractive and economical in maintenance.

Furthermore Nuttall Helical Gears for railway service are given the famous B P Heat Treatment. They are "tough hard,"— guaranteed specifically for 400 per cent greater wear and breakage resistance than gears of standard untreated cast steel.

The recent convention of the A. E. R. A. clearly showed the trend in car building for passenger preference. If you did not visit our exhibit let us send you now our data covering the important part to be played by silent helical gearing.

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall

HITENSO
for strength

Where service conditions are exceptionally severe—

Where traffic interruptions are unusually costly—

Where overhead wires run under elevated structures or along subway ceilings—

Hitenso Trolley Wire—exclusively an Anaconda product—serves best.

Hitenso "C" combines great strength with the least possible sacrifice in conductivity. It meets the physical requirements of the A.S.T.M. specifications for high strength bronze and exceeds in conductivity by 15%.

It has proved its dependability and economy in many outstanding installations.

ANACONDA COPPER MINING CO.
THE AMERICAN BRASS COMPANY
Rod, Wire and Cable Products
General Offices: 25 Broadway, New York
Chicago Office: 111 W. Washington St.

ANACONDA TROLLEY WIRE

ANOTHER IMPORTANT BATES-TRUSS INSTALLATION

THE steel overhead bridge structures in this installation are Bates built. They were designed, detailed, fabricated and galvanized by the Bates organization.

Close co-operation between the Engineers of the Chicago, North Shore & Milwaukee Railroad and the Bates organization resulted in the completion of this large structural part of the project, on schedule time. We believe we have just reason to be proud of this installation.

Bates Expanded Steel Truss Co.
East Chicago, Indiana
U. S. A.

Your Copy—

I will appreciate a copy of the folder telling about the Chicago, North Shore & Milwaukee Railroad installation

NAME..

COMPANY..

ADDRESS..

INTERNATIONAL
STANDARD ELECTRIC CORP.
General Export Distributors

SAMUEL BROWN, LTD., *New Zealand*
JOST ENGINEERING CO., LTD., *India*

BATES-TRUSS
Expanded
MADE ONLY BY

Bates Expanded Steel Truss Co.
Sales, Engineering and Executive Offices
EAST CHICAGO, INDIANA

AMCRECO

CREOSOTED
SOUTHERN YELLOW PINE
PRODUCTS
ARE BACKED BY AN
INSTITUTION

Time is essential to demonstrate the qualifications of any business to be classified as an institution.

Time alone can prove the ability, the sincerity of purpose, the stability of ideals, etc., which are necessary attributes of an "institution."

The American Creosoting Company is not only big in its conception and in its development, but it has met the test of time. Dating back practically to the inception of wood preservation in this country on a commercial scale, it has been in the forefront of developments in this industry ever since.

Tie and pole users readily appreciate the value of dealing with such an "institution."

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED
AMCRECO LOWRY PROCESS CREOSOTED WOOD
GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE ~ KENTUCKY

SALES OFFICES

332 So. Michigan Ave.
Chicago

350 Madison Ave.
New York City

Brunswick, Ga.

401 W. Main St.
Louisville, Ky.

Bogalusa, La.

Poles for transmission and trolley lines.

Ties for steam and electric railways.

Piling and timber for highway bridges.

ERJ10-9Gray

When the reports were read

—it was found that improved practice pays. And that Boyerized Car Parts had improved service and had cut operating costs because they outlast steel parts three to four times.

This exceptional service is due to a special treatment called the Boyerizing Process.

Try Boyerized Products under your own conditions and note their ability to stand up under the most severe service.

Pick the items you need. Then send for quotations.

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
McArthur Turnbuckles
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings

The McArthur Turnbuckle

Bemis Car Truck Company
Electric Railway Supplies
Springfield, Mass.

Representatives:
Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin. 772 Pacific Electric Bldg., Los Angeles, Cal.

ALUMINUM

CAR STRUCTURE

The use of high-strength aluminum has in some cases reduced first-cost and has always reduced weight. One pound of aluminum shows a saving of two pounds over heavier metals. The modern car is a light car.... aluminum saves weight!

High-strength aluminum alloys are furnished in sheet, sand- and die-castings, permanent-mold castings, tubing, rivets, mouldings, etc.

A. C. S. R.

Aluminum Cable, Steel Reinforced, is remarkable for its lightness, strength and great reliability in service. Having a core of steel, it is the ideal material for a main catenary or messenger cable because it combines the functions of messenger and feeder in one cable.

In A.C.S.R. the aluminum strands provide the necessary electrical conductivity and give the steel core positive and permanent protection against corrosion.

CONDUIT

Its weight is about 1-3 that of ordinary metal conduit. The 1 in. size weighs only .6 lbs. per ft.; the ½ in. size only .3 lbs.

100 lbs. of aluminum conduit saves 200 lbs. of weight by displacing 300 lbs. of ordinary metal conduit.

Also aluminum is unusually resistant to common corrosive agents. No paint ever needed .... easier to install .... and only 1-3 the weight!

Booklets sent on request cover Strong Alloys, Conduit, Paint Casting Alloys, etc. Please mention the field in which you are interested.

ALUMINUM COMPANY OF AMERICA
OLIVER BUILDING, PITTSBURGH, PENNA.
Makers of Aluminum in Every Commercial Form

In Western Canada

100% users of "Tool Steel" Gears and Pinions

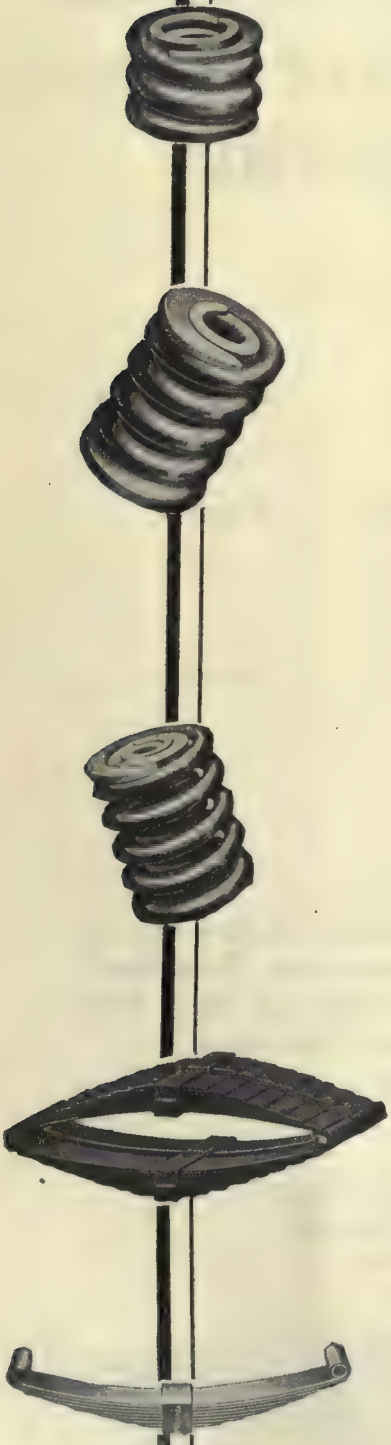
Winnipeg	Saskatoon
Regina	Port Arthur
Fort William	Brandon
Moose Jaw	Victoria
Lethbridge	Vancouver
Calgary	Edmonton

ABSOLUTELY every Electric Railway line in this progressive territory buys "Tool Steel" Gears and Pinions. Most of them have standardized on "Tool Steel" for years.

Can there be better proof of *Quality Leadership?*

THE TOOL STEEL GEAR
& PINION COMPANY
Cincinnati, Ohio

The Springs they buy again



Only springs of dependable quality are bought by railway men over and over again. The fact that for more than 20 years leading railway properties have repeated continuously on "Fort Pitt" Springs, is all the *proof of reliable service* any reasonable man wants.

Order "Fort Pitt" Springs for your modern, quiet, comfortable-riding cars.

Consider some of these—

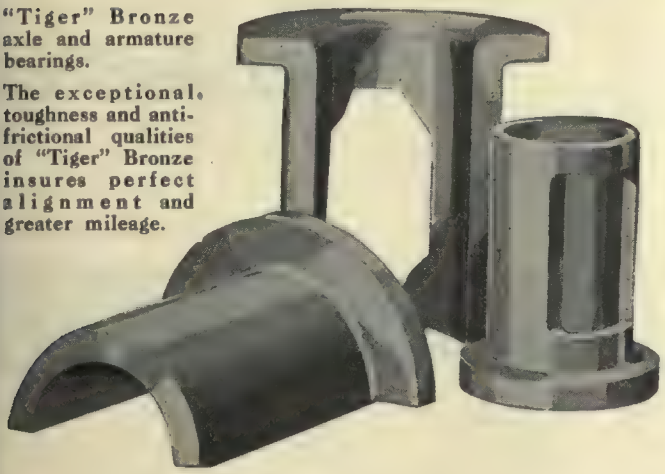
Full Elliptics for Car Trucks;
Half Elliptics for Locomotive and Cars;
Special Types of Quarter, Half and Three-Quarter Elliptics for Electric Railway Service;
Drawbar Springs, Equalizer Springs, Extension Springs.

Prompt shipments can be made. Write for Catalog and Specification Book.

Fort Pitt Spring & Manufacturing Co.
Pittsburgh, Pa.

FORT PITT

Another Year of Service



"Tiger" Bronze axle and armature bearings.

The exceptional toughness and anti-frictional qualities of "Tiger" Bronze insures perfect alignment and greater mileage.

Our exhibit at the convention marked another milestone in the half century of More-Jones growth. Each year we are able to display our quality products with the knowledge that we are making our exhibit to a steadily increasing number of purchasers.

These purchasers enjoy complete confidence in our uniform products and our ability to always lead in new engineering practices.

M-J Armature Babbitt Metal, a scientific combination of new tin, copper, antimony, and *metallic nickel*—no lead used—insures lowest net cost per mile of operation.

M-J lubricated and V-K Oilless Trolley Wheels and Non-Arcing Harps.

The alloy of pure new metal, offering greatest conductivity, is exceedingly tough, yet does not grind away the metal of the wires. Perfect lubrication is accomplished automatically. Properly balanced and mechanically perfect in finish, greater mileage assured. Lowest in ultimate cost and highest in net efficiency.

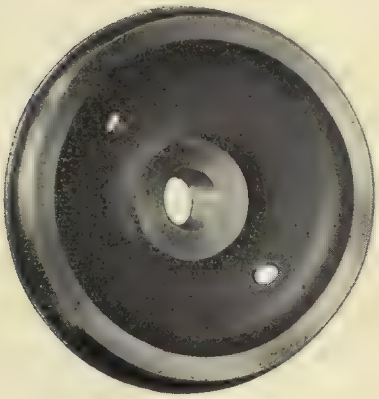
MORE-JONES QUALITY PRODUCTS

MORE-JONES BRASS & METAL CO.

ST. LOUIS, MO.

BETHLEHEM RAIL

for Electri



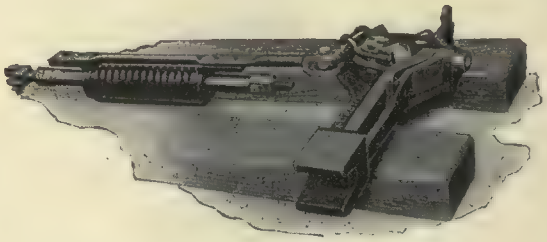
Ore to Finished Trackwork

All materials, rails, plates, bars, forgings, castings, bolts, etc., are made in Bethlehem Plants—from ore to finished product, under Bethlehem constant supervision.

Great care and attention is given to special layouts. Before shipment layouts are assembled to make sure that they will correctly meet conditions in the field.

The fitting up work is done under roof where workmen are shielded from inclement weather, thus enabling them to do accurate work.

Bethlehem manufactures all types of frogs, switches, crossings and special layouts for Electric and Steam Railways; also mine track.



Parallel Throw Switch Stand
Model 1222—4¾ in. high

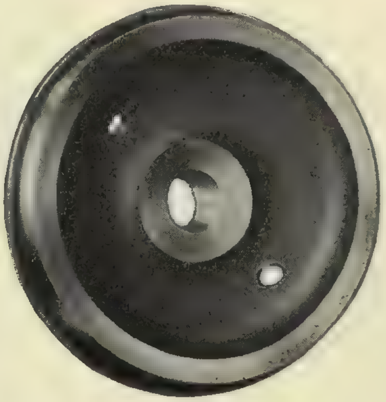
Center Rib Base Plate

Abbot Base Plate

BETHLEHEM

WAY PRODUCTS

Railways

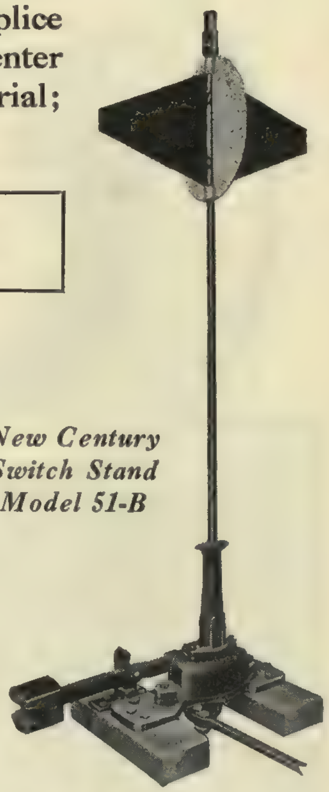


Bethlehem Track Specialties include:

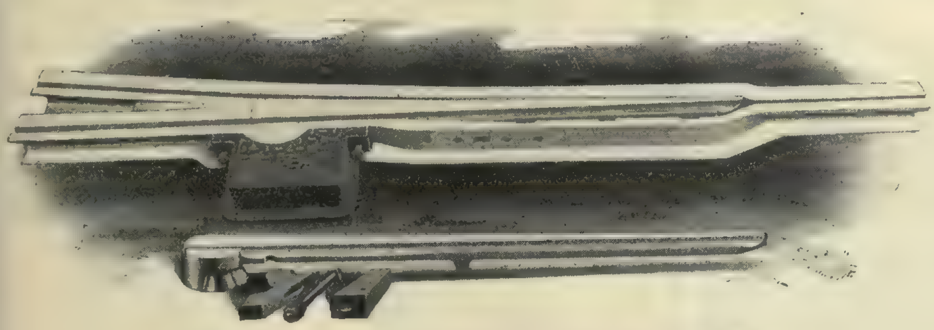
Special Trackwork; Tee and Girder Rails; Special Splice Bars for Welding; Machine Fitted Joints; Abbott and Center Rib Base Plates; Tie Rods; Bolts; Pole Line Material; Rolled Steel Wheels and Forged Axles.

Special Trackwork and Layouts

Catalog Sent on Request



New Century Switch Stand Model 51-B



Solid Manganese Tongue Switch, Design 905

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

District Offices:

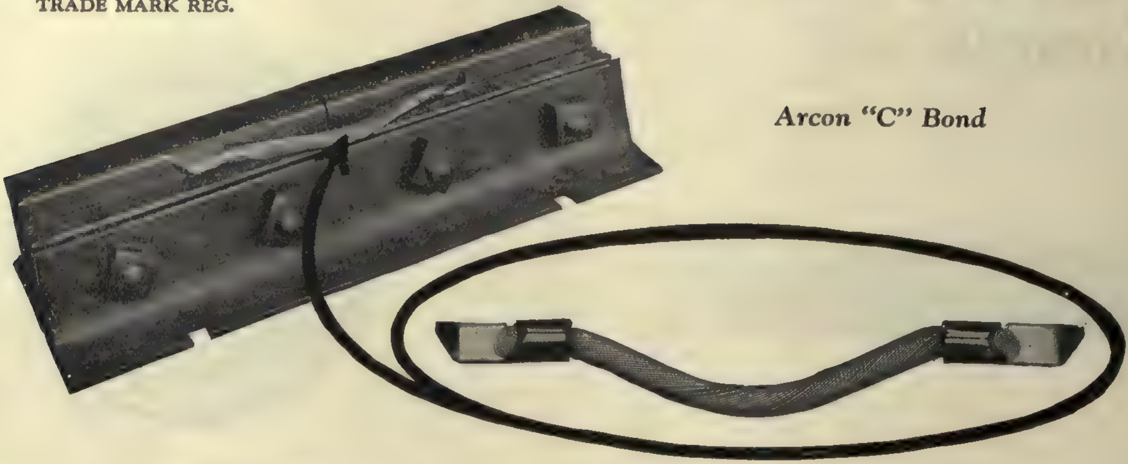
New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo
Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Seattle Los Angeles Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

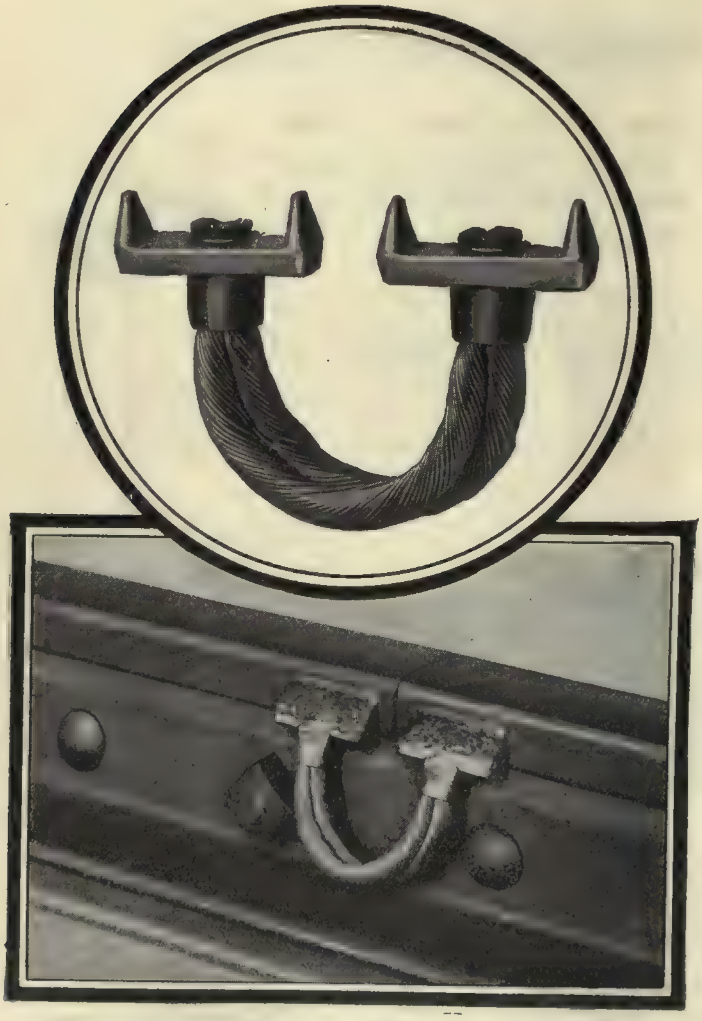
BETHLEHEM

ARCON RAIL BONDS

TRADE MARK REG.



Arcon "C" Bond



The Arcon "C" Bond in detail, and its application to Weber Joint is shown above.

The application of this bond is simple and effective. All parts of the terminal and rail are accessible. The weld is accomplished easily and quickly.

The open shape of the Arcon "A" terminal is especially desirable since the arc can be directed freely upon the conductor at the junction of the terminal and the rail.

Prices and descriptive literature sent on request.

Arcon "A" Bond

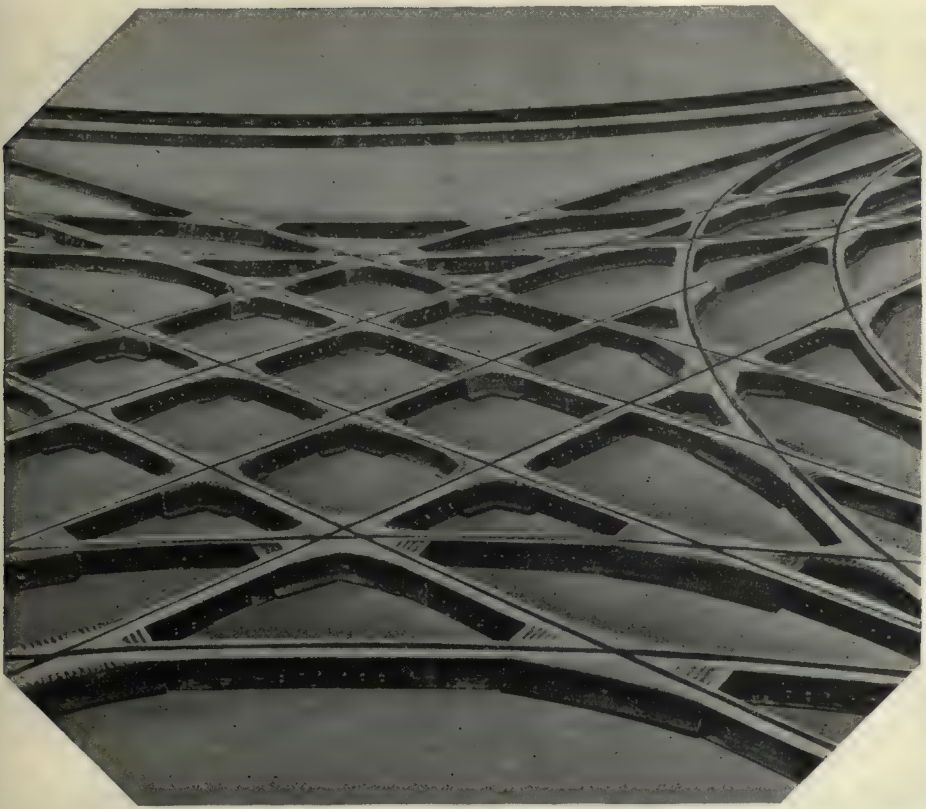
A S&W

AMERICAN STEEL & WIRE COMPANY

Sales Offices

Chicago New York Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore
Wilkes-Barre St. Louis Kansas City St. Paul Oklahoma City Birmingham Memphis Dallas Atlanta Denver Salt Lake City

Export Representative: U. S. Steel Products Co., New York
Pacific Coast Representative: U. S. Steel Products Company, San Francisco, Los Angeles, Portland, Seattle



Behind BUDA track work and equipment lies 45 years' experience and the most modern facilities. The name BUDA is your assurance of the highest quality.

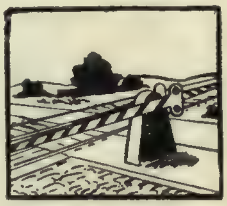
THE BUDA COMPANY, Harvey, Illinois

BUDA
ESTABLISHED
1881

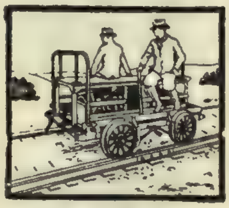
Track and Bonding Drill

Track Jack

Bus Engines



Crossing Gates



Electric Trucks

Buda Hubron Earth Drill

On the BUDA-HUBRON Earth Drill some companies report cutting their pole hole digging to 1/6 their former cost by hand.

Some typic
STANDARD RC

LIGHT-WEIGHT safety cars, typical city cars, subway and elevated cars, heavy interurbans and sturdy work cars, the country over, are running on "STANDARD" Rolled Steel Wheels. Included in this list are cars on some of the foremost electric railways—such as the Interborough Rapid Transit Company, the Philadelphia Rapid Transit Company, the Southern Pacific Lines, the Chicago North Shore and Milwaukee Railroad, the Brooklyn City Railroad, the Northern Ohio Traction & Light Company—to mention only a few.

Maintenance records of these "STANDARD" Equipped railways prove the economy and reliability of "STANDARD" Products.

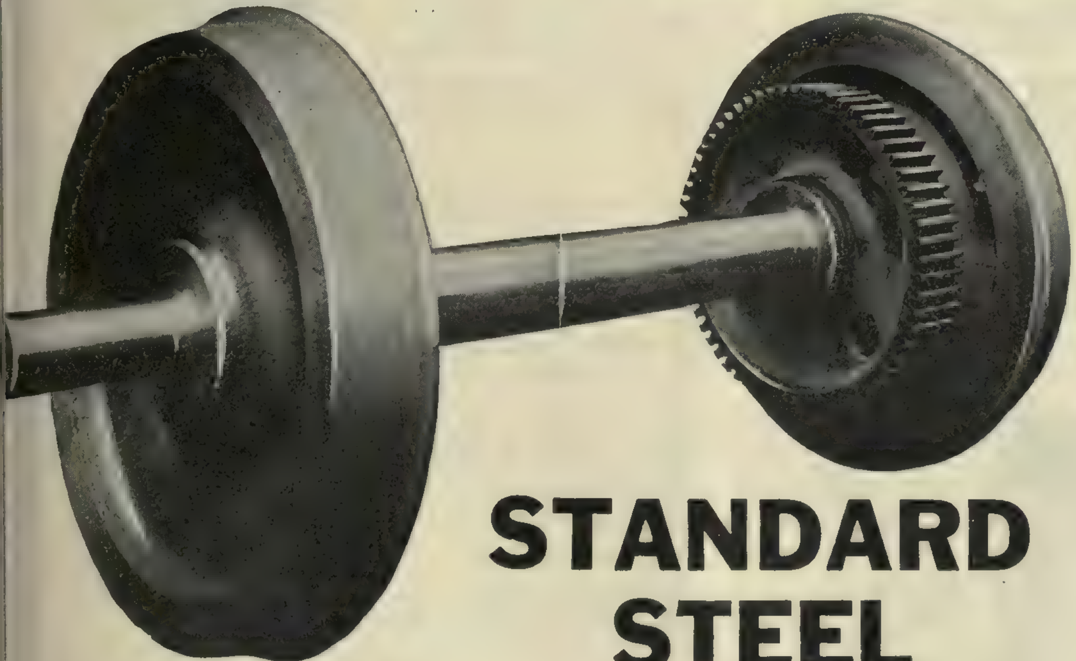
Rolled Steel Wheels

Coil and Elliptic Springs

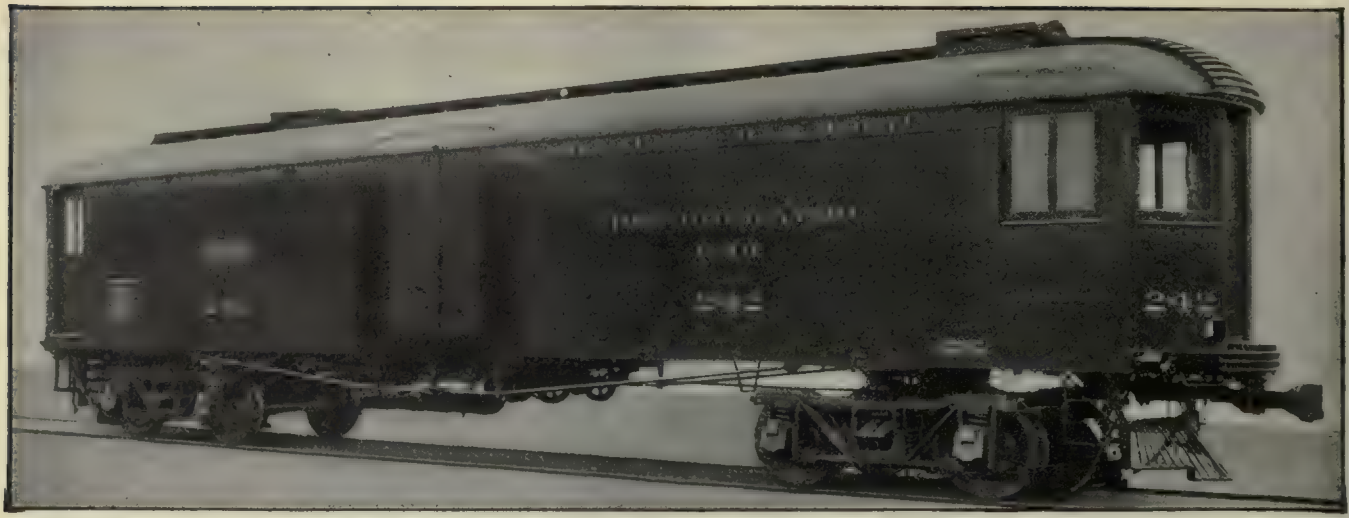
Quenched and Tempered Carbon Steel Axles

Armature Shafts

rs equipped with
D STEEL WHEELS



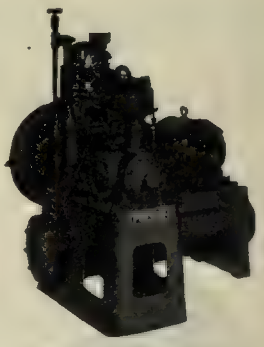
STANDARD STEEL WORKS COMPANY
PHILADELPHIA, PA.
BRANCH OFFICES:
CHICAGO HOUSTON, TEXAS SAN FRANCISCO
ST. LOUIS PORTLAND, ORE. ST. PAUL, MINN.
NEW YORK RICHMOND, VA. PITTSBURGH, PA.
WORKS: BURNHAM, PA.



Phoenix Refrigerator Cars
for Electric Railways

Among the exhibits of unusual interest at the Cleveland convention was the Phoenix Electric Railway Car which, for three years, has given highly satisfactory service on the Northern Ohio Traction Lines.

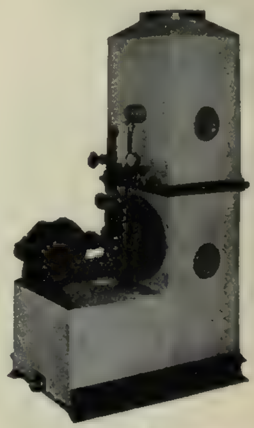
The continuous successful operation of this car and the building of five Phoenix Electric Railway Cars by the Chicago, North Shore & Milwaukee Railroad, prove that Phoenix Electric Railway Cars have progressed quite beyond the experimental stage. They now take their place as a necessary part of the equipment of the electric railway which aims to serve its community more widely, and which seeks another source of income.



Phoenix Transportation Refrigerating Unit

Phoenix Electric Railway Cars present big opportunities for service and profit in a new field without adding new problems. Automatic in operation, they require no care but that regular crews can conveniently give them, and the installations present no difficult problems to shop men. Icing and other service stations are entirely unnecessary.

The initial cost of a Phoenix Electric Railway Car differs but little from that of a standard ice refrigerator car. Any standard freight or express car can be easily converted into a Phoenix Electric Railway Car in your own shops. Our Service Department will coöperate with your Mechanical Department or with any car builder.



Laken Indoor SpraTower
(Patented)

Write for further particulars.

THE PHOENIX ICE MACHINE CO.
Cleveland, Ohio

PHOENIX
ICE MACHINE

Do You Buy Pounds of Metal or Foot Pounds of Work?

IT IS miles, not rubber which you purchase when you buy a tire for your motor car and it is really *work*, not iron, which you want in a brake shoe. The price of one is considered on quality alone. The price of the other should be based on quality too. A pound of brake shoe metal is, in fact, of value only when converted into foot pounds of work. If a pound of specially developed shoe can do 50% more work than a pound of ordinary shoe, is it not worth a higher price? American Brake shoes cost a little more per pound of metal, but less per foot pound of useful work.

"Best by Test"

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO

Friction and your Profits

EVERY hour that your machinery is running, friction is cutting away the bearings, little by little. The toll of friction, after a single day's operation of the machinery, is so small that it cannot be measured; but as month after month goes by it becomes apparent. A worn bearing that must be repaired, a machine which requires a general overhauling, a piece of machinery so badly worn that it cannot be overhauled, but must be replaced—these tell the story of the ravages of friction.

As friction grinds at the bearings, so it eats into your profits. The new bearing, and the labor cost of replacing it; the expense of a general overhauling; the cost of the fuel required to generate extra power for a machine which runs a little harder than it should—these are only a few of the items which make up the toll that friction takes from your profits.

Of course, friction cannot be eliminated entirely. But it can be reduced to a minimum by the use of oils and greases exactly suited to the machinery.

Standard Oils and Greases

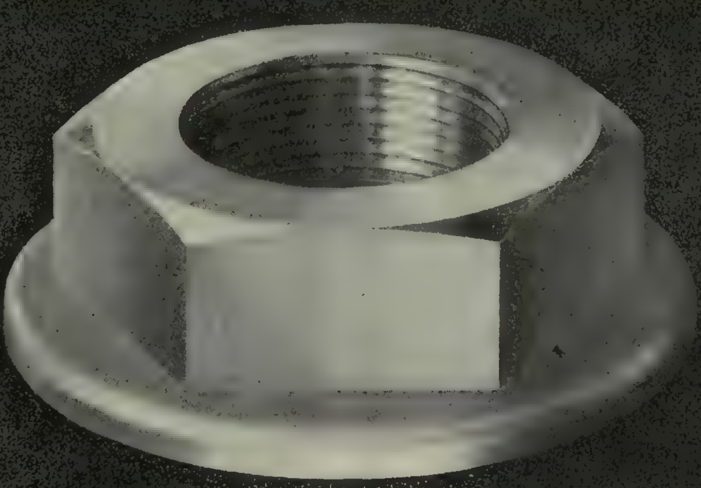
are made in many grades to suit the requirements of all machinery used in the industrial world today. They are lubricants of the highest quality, and will reduce friction, and friction's drain on your profits, to a minimum.

Our representative will recommend
the grades suited to your machinery

STANDARD OIL COMPANY
(INDIANA)
910 South Michigan Avenue Chicago, Illinois

EMPIRE BOLTS & NUTS

How often does the newspaper say "The accident was caused by a defective bolt or nut." Think of this the next time you are tempted to buy bolts and nuts on price alone. . . . . .



PRECISION OF FIT

•

STRENGTH OF THREAD

ACCURACY OF FINISH

•

PERFECT HEX

RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY

PORT CHESTER, N.Y.

Branch Office: Straus Building **CHICAGO**

Branch Office: General Motors Bldg. **DETROIT**

Branch Factory: **ROCK FALLS, Ills.**

Strimple & Gillette 169 Jackson Street **SEATTLE**

Maydwell & Hartzell, Inc. 158-168 Eleventh Street **SAN FRANCISCO**

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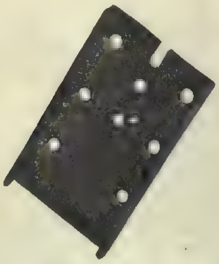
Selected after Definite Tests

ROL-MAN PARTS
for B. M. T. Cars

Chafing Plates

Pedestal Liner


Journal Box Liner

Wear Plates

Repeated shock under heavy loads. Continual grinding wear under heavy pressure. Little or no lubrication. These are the causes of high mortality among truck and car parts, with a consequent loss of time, labor and profits due to repeated pull-ins for repairs and renewals.

For several years past, the Brooklyn-Manhattan Transit Corporation has used ROL-MAN Manganese Steel Truck and Car Parts for old car replacements such as pedestal guides, journal box guides, bolster and transom chafing plates and similar parts where excessive wear occurs. ROL-MAN Parts have been under rigid scrutiny. They have met definite tests which prove their superior wearing qualities and the savings to be effected through their use.

And now the sixty-seven new articulated cars for the B. M. T. are being completely equipped with ROL-MAN Manganese Steel Truck and Car Parts.

ROL-MAN Parts are long-lived because they resist wear. In fact, their resistance to abrasion actually increases as they become toughened and hardened under repeated impact and wear. Consequently, they last for years and require a minimum of attention. Think what that means to you in keeping your cars out on the lines earning profits rather than in the shops eating up dividends.

You'll notice, too, since the wear on ROL-MAN Parts even over a period of years is almost imperceptible, that cars equipped with them have less vibration and consequently operate with much less noise.

Finally, glance at the physical properties of ROL-MAN (rolled Manganese) Steel. That should convince you.

Now, send us your specifications.

PHYSICAL PROPERTIES of ROL-MAN ROLLED and FORGED MANGANESE STEEL

Ultimate Tensile	140,000 to 160,000 lbs. per square inch
Elastic Limit	60,000 to 75,000 lbs. per square inch
Elongation	35% to 50% in 2 inches
Shearing Strength	100,000 to 110,000 lbs. per square inch

Non-Magnetic

ROL-MAN
Rolled or Forged Manganese
Steel Truck and Car Parts

- **Journal Box and Pedestal Jaw Gibs or Liners**
- **Bolster and Transom Chafing Plates**
- **Bolster Hanger Wear Plates**
- **Side-frame Wear Plates**
- **Bolster End Wear Plates**
- **Brake Rod Chafing Plates**
- **Truck and Body Bolster Center Plates**
- **Brake Beam Wear Plates and End Supports**
- **Buffer Wearing Plates—Sector Bar Liners**
- **Draw Bar Parts for Car Bodies**
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MANGANESE STEEL FORGE CO.

Main Office and Works:
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LOS ANGELES OFFICE 320 S. San Pedro St.

Manufacturers of
ROL-MAN ROLLED and FORGED MANGANESE STEEL PRODUCTS

Above Photo, Courtesy
Denver Tourist Bureau.

Arapahoe Street, Denver, Colorado.

A Mile-High
Service Record

IN APRIL, 1908, in Denver, Colorado, the "Mile-High City," Carnegie Steel Cross Ties were installed on Arapahoe Street. The ties were laid on a rock ballast and then concreted up to the top of the tie. Until 1921 the heavy cars of the Denver Interurban, weighing 62 tons each, were operated on this line.

In May of this year, the track was paved over, as the need for bringing the interurban cars into the center of town had been eliminated. The unretouched photograph above shows one of the Carnegie Ties just as it was dug from the concrete—after eighteen years of service.

The chief engineer of the Denver Tramway Corporation stated that the ties were in an excellent state of preservation and that both clips and ties could have been used for rail renewal.

Service records like this prove the wisdom and economy of laying track on a permanent foundation.

Booklet—"Steel Cross Ties"—sent at your request.

CARNEGIE STEEL COMPANY

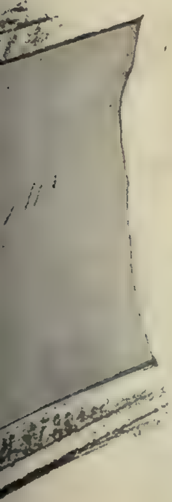
General Offices - Carnegie Building - 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA

1824

Collier

Car Card Advertisin



THE modern, attractive, well-designed passenger car was developed from the crude vehicle of generations past through years of effort on the part of experts long experienced in public service.

So too, the artistic, appealing car cards of today are a vast improvement over the advertising posters of yesterday. This change likewise, was made possible only through the effort of those long trained in their own special field.

Modern car cards are the shoppers' and marketers' guide illustrated in full color. They are not only an attractive feature of *your* service to *your* patrons, they are also an active asset. *They stimulate trade—and trade is the basis of traffic.*

Barron G. Collier
INCORPORATED

Service
lmost everywhere!

WHARTON
Special Trackwork

FROGS-MATES-SWITCHES
CROSSOVERS

To help *create* new traffic and carry it *economically*—

Wharton Special Trackwork performs a double function in the modernization program.

In the first place it helps to create new traffic by providing a more permanently smooth roadbed, over which modern cars may ride easily, quietly and with utmost comfort to passengers.

And at the same time it reduces operating costs through its ability to stand up under continuous heavy traffic conditions, with least possible maintenance and depreciation.

Sixty years of experience in design, composition and manufacture of trackwork, together with the use of the famous TISCO Manganese Steel at points of wear,—these are the guarantees back of Wharton Trackwork economy.

Consult us on any problem of trackwork—special or otherwise.

WM. WHARTON JR. & CO., Inc.
Easton, Pa.

Sales Offices

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El Paso
New York
San Francisco
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Thirty-Two
Modern Up-to-date Cars

Just received by the

MEMPHIS STREET RAILWAY CO.

equipped with

Chilled Wheels

A.R.A. Standards

650 lb. Wheel for 30 Ton Cars
700 lb. Wheel for 40 Ton Cars
750 lb. Wheel for 50 Ton Cars
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ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS
1847 McCormick Building
CHICAGO

50 Plants—Daily Capacities 20,000 Wheels

VIZABLEDG
PATENTED
SAFKAR
TRADE MARK REG
SAFSTEP

In adopting this approved accident-proof safety car step, you will be buying dependable liability insurance at extremely low cost.

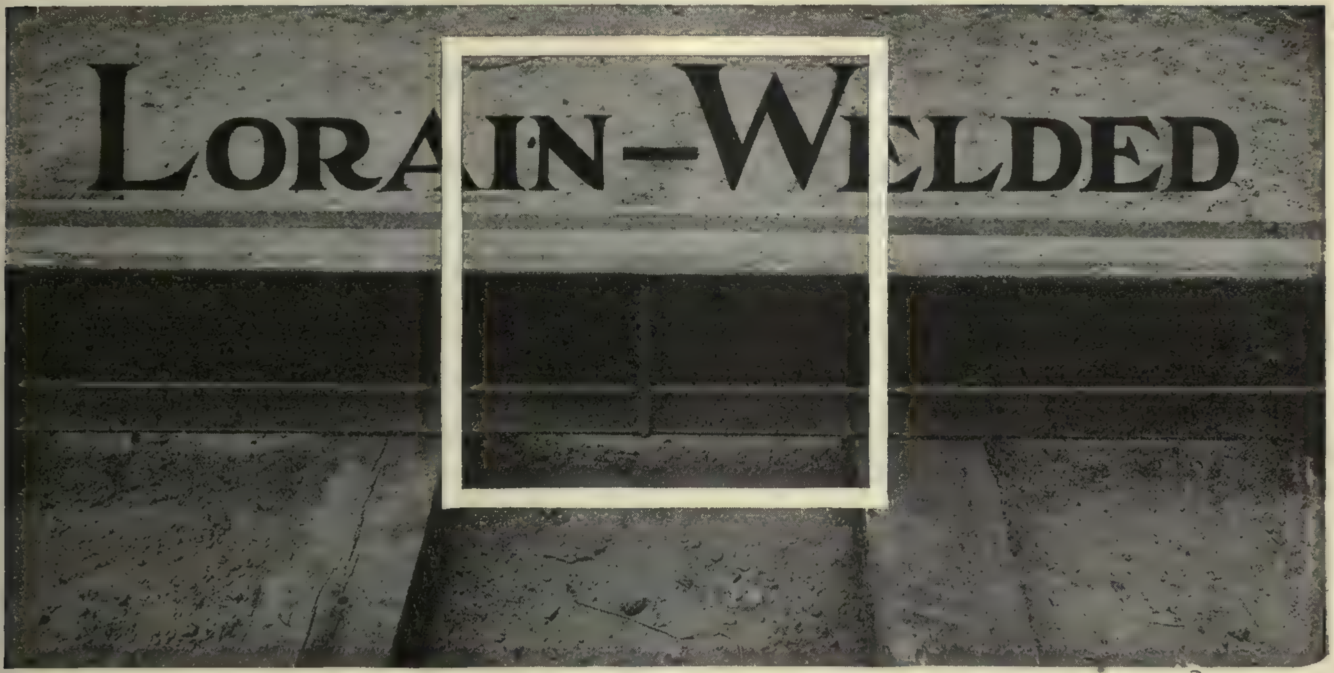
Slip-proof, miss-proof, self-cleaning, it minimizes "aisle" accidents as well as "step" and "platform" accidents.

Damages paid for one such accident may cost you more than a "Safkar" Step equipment for every car on your system.

Let us send Bulletin D 28.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.
Established 1902

P-135



—also means *FORGED!*

In making track welds that will not "cup," crack or deteriorate in the hardest kind of service—the steel must be *forged while it is still hot.*

And the only two processes that simultaneously weld and forge the rail joints are

The two

Lorain Processes of Electric Welding

(Butt Weld and Bar Weld)

United States Bureau of Standards Repeated Impact Tests.
Butt-welds on Lorain Rail, 624,600 blows, 1,412,500 blows and 1,497,000 blows.
Lorain Solid Rail, 1,353,300 blows.
Bar-welds, 473,500 blows and 694,200 blows.

Write our nearest sales office for full particulars of Lorain Processes and Lorain Products.

The Lorain Steel Company

General Offices: Johnstown, Pennsylvania

Sales Offices:

Atlanta Chicago Cleveland Dallas New York Philadelphia Pittsburgh

Pacific Coast Representatives: U. S. Steel Products Co., San Francisco, Seattle, Portland, Los Angeles
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LORAIN

Make your new cars
modern throughout!

INTERNATIONAL
ELECTRICALLY OPERATED
FARE REGISTERS

will help make full collection and registration of fares an assured fact.

Do not install a slow and unreliable system of fare registration, just because you have used it for many years. It would be inconvenient with the many modern improvements on your new car.

The International Electrically Operated Fare Register is more quickly and easily operated, and therefore more accurate and reliable. Its mechanism is of the simplest design. Only the finest materials and workmanship are used in its construction. Furnished with either hand or foot control or automatic attachment in connection with a Fare Receiving Box. Single and Double Registers.

Write today for full details.

The International Register Company
No. 15 South Throop Street, Chicago, Ill.

After all's said and done—

The only trolley catcher or retriever worthy of being used on MODERN cars is the one which embodies EVERY safety feature and possesses EVERY operating advantage that past experience has proved to be desirable.

Check over these famous
EARLL FEATURES again

1. No-Wear check pawl—short, simple and sturdy—always engages full face on, never strikes point of teeth.
2. Free winding tension spring handles wet rope just as easily and efficiently as dry.
3. Perfect and automatic lubrication of every part through one oil hole once in three months.
4. Ratchet wind simplifies retriever winding, saves time and trouble.
5. Emergency release permits of trolley being run up again instantly at any speed in case of emergency.

If you were not among those we had the pleasure of talking to at the Convention, please write for our latest bulletin. There is an improved type of Earll Catcher or Retriever for every class of service.

EARLL
Catchers
and Retrievers

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The time your salesmen can save would pay for it many times

"Who are the men I should talk to in the Blank Railway Company?"

You'll find the answer quickly in the 1926 Edition McGraw Electric Railway Directory. Keep a copy handy—in your desk, in your brief case. You'll need it.

Call on the right men—the men who specify or buy. If your salesmen cover wide territories, they can't be expected to know all the changes in personnel of the roads they call on.

Our records showed 65% in changes since our 1925 Edition was published.

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Don't waste valuable time and effort in a $300,000,000 market by misdirecting your sales program. Save both by returning the attached coupon.

Here are the inside facts

1—Complete list of every recorded electric railway company in the United States, Canada, Mexico and the West Indies.
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4—Addresses of repair shops.
5—Mileage of track and bus routes.
6—Number and kinds of cars used.
7—Rates of fare.
8—Amusement parks owned or reached.

Price $7.50 a Copy

10% discount for five or more

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FORGED STEEL AXLES
For Electric Railway Motors

Conforming to A. E. R. E. A. Standard Specifications either Annealed or Quenched and Tempered. Furnished Rough Turned All Over or Finished Turned and Burnished.

Armature Shafts and Special Round Forgings of all kinds to Specifications.

Get our quotations.

It will pay you to send us your drawings and ask for our prices.

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Keep them running on Schedule this Winter!

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SPRING SCRAPERS

ROOT SPRING SNOW SCRAPERS will keep the track clear of snow and ice. Assure 90% of summer schedules in the dead of winter through their use. They are pneumatically operated and can be put into instant use by the motorman without leaving his station.

Send for Catalog showing the complete line of Root Scrapers and other equipment.

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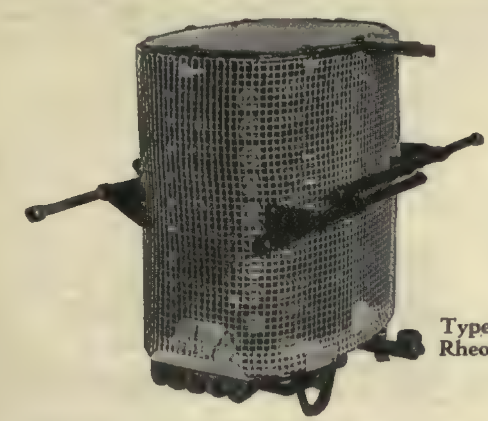


Type SR
Rheostat

ERICO Type SR Portable Welding Outfit *is*

Easy to Weld with

Five current taps provide proper welding currents at all conditions of power from half to full line voltage. All connecting leads are made from flexible rubber covered cable.

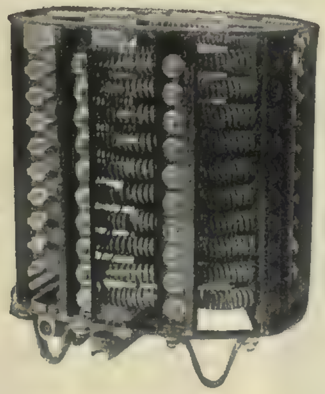
Easy to Handle

Light weight—only 150 lbs.—and compact shape assure easy transportation of the rheostat. The carrying handles slide in beside the rheostat when not in use. For extended bonding or welding a light weight, easy running Larry can be furnished.

No trouble to Maintain

Type SR Rheostat is a rugged brute—the frame is made of specially formed channels of great strength. The resistance wire coil is of practically indestructible heavy wire. The wire is insulated from the frame and the frame is itself insulated from the ground by means of pure mica washers. All parts are given a rust proof finish which will withstand practically any climatic condition.

Ask for Circular 17



The Electric Railway Improvement Co.
2070 E. 61 Place Cleveland, Ohio

Sullivan Busters and Sullivan Portable Compressor breaking concrete in Philadelphia. Mazzola-Marano, who were contractors on this job, ran 4 "DW-221" Heavy Busters at a time with the "WK-314."

Cut Concrete Quicker

Good will of the Public has cost you years of effort—why risk that good will by keeping streets blocked longer than necessary—by using slow, expensive methods to tear up concrete.

Sullivan Busters

and a Sullivan Portable Air Compressor, on a recent job, reduced the cost of removing concrete, from 30c. a square foot, to 5c. On another job, a single Buster did in 20.5 hours, work which formerly required 10 laborers more than two weeks to do.

You will be interested in the following free booklets. Write for them.

Portable Compressors..........Booklet 3283-D
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But if the "tune" is a crossing smash?

Usually the railroad gets "stung." Unless it can be proved such warning was given as only sheer foolhardiness could have ignored. Such warning in fact as that given by a Nachod Highway Crossing Signal. It rings, it flashes, it even wig-wags. And it shows to the motorman *if* by any chance it should fail to work.

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Spells Safety

Automatic Headway Recorders
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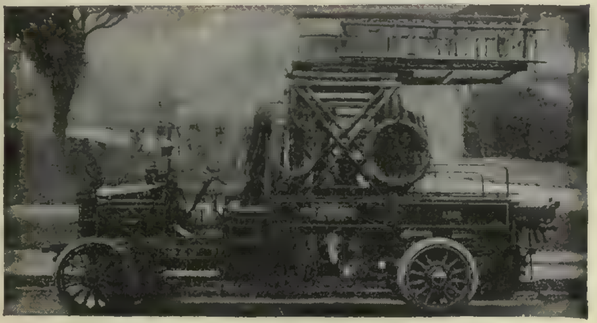
Pantasote Products for Both ELECTRIC RAILWAYS AND BUSES



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This 3-Section

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The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

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Not if you use

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BABBITT *for* ARMATURES

keeps the rolling stock rolling

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Established 1880
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Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
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A. L. DRUM & COMPANY
Consulting and Constructing Engineers
VALUATION AND FINANCIAL REPORTS
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CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
230 South Clark Street, Chicago, Ill.

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Traffic and Transportation Surveys
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Traffic Analyst, Schedules
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THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
Street Railway Inspection DETECTIVES
131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

UNA
RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.

STUCKI SIDE BEARINGS
A. STUCKI CO.
Oliver Bldg.
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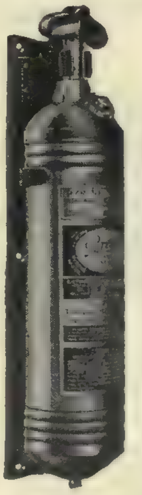
THE WORLD'S STANDARD
"IRVINGTON"
Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper
Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds
Irvington Varnish & Insulator Co.
Irvington, N. J.
Sales Representatives in the Principal Cities

FOR SAFETY FROM FIRE
INSTALL THE
IMPROVED Pyrene TRADE MARK FIRE EXTINGUISHER

Safety demands that every car or bus be equipped with a Pyrene Fire Extinguisher. The riding public expect and are entitled to the protection from fire which this extinguisher assures.

Aside from the protection from fire afforded by such installation, to both rolling stock, operator and passengers, the schedule of the Central Traction and Lighting Bureau specifies a charge of 5¢ on motor buses, 3¢ on interurban and 1¢ on urban cars, for the absence of fire extinguishers.



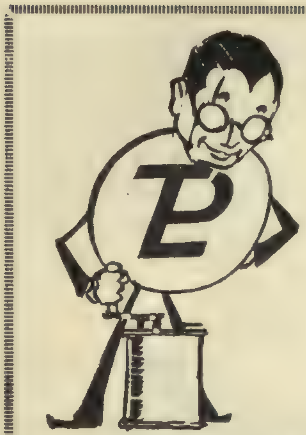
The slight outlay involved by having rolling stock equipped with an Improved Pyrene (one-quart) Fire Extinguisher should be regarded as an investment—a device that helps make safety from fire certain should be popular.

Safety adds to the revenue of the operating company by inspiring confidence in the riding public toward modern transportation.

Many of the leading Public Service Corporations recognize this and have equipped their cars and buses with Pyrene Fire Extinguishers—they know a burning car or bus need not be abandoned if a Pyrene Fire Extinguisher is at hand.

For the protection of electrical equipment, power houses, car barns, shops and storerooms PYRENE (1½ quart) Fire Extinguishers are dependable in every emergency.

PYRENE MANUFACTURING CO.
NEWARK, N. J.
"Fortify for Fire Fighting"



There's more to a car than the Controller

Every part that goes into the assembly of your electric cars should be carefully inspected and tested to make sure they function properly and meet your exacting specifications. P. T. L. Inspectors, located in the large industrial centers, are thoroughly familiar with your service requirements and guarantee a rigid inspection and test of every item entering into the manufacture and assembly of your purchases.

Bulletin No. 28 tells how we do it in detail. Write to-day.

PITTSBURGH TESTING LABORATORY
PITTSBURGH ***Inspecting Engineers and Chemists*** PENNA.
Branch Offices in the Principal Cities

ELRECO TUBULAR POLES

COMBINE

Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

The DIFFERENTIAL CAR

Standard on 60 Railways for

- Track Maintenance
- Track Construction
- Ash Disposal
- Coal Hauling
- Concrete Materials
- Waste Handling
- Excavated Materials
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Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.

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KALAMAZOO, MICH., U. S. A.

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BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

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Waterproofed Trolley Cord

Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

If you are not familiar with the quality you will be surprised at its ENDURANCE and ECONOMY.

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY
Manufacturers of bell, signal and other cords.
Newtonville, Massachusetts

Advertisements for the

Searchlight Section

Can be received at the New York Office of Electric Railway Journal until 10 a. m.

Wednesday

For issue out Saturday

0220

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

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INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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1 to 3 inches	$4.50 an inch
4 to 7 inches	4.30 an inch
8 to 14 inches	4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E R J

Over 6000 other men in the Electric Railway Field will see this page-

Then isn't this the logical place to advertise any business wants you may have of interest to Electric Railway men? Employment—Business—Equipment Opportunities, Etc., Etc., Etc.

POSITIONS VACANT

MASTER mechanic wanted—familiar with electrical motor equipment and cars, preferably one who has had experience with mining locomotives and cars. Give age, experience, salary expected, and references. P-938, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill

POSITIONS WANTED

OPERATING executive, now employed desires change, twenty-five years' practical electric railway transportation experience, familiar with making schedules, public relations, labor and traffic problems, and requirements for successful and efficient operation. PW-935, Electric Railway Journal, 7 So. Dearborn Street, Chicago, Ill.

YOUNG man, age 27, now employed as statistician, over five years' experience in street railway and bus operation, familiar with transportation, commercial, traffic and research work, desires position as Commercial manager on small property that needs modern methods of selling rides to convert red figures into black; would also consider position with bus manufacturer in the sales department. PW-937, Electric Railway Journal, Guardian Bldg., Cleveland, O.

SALESMEN WANTED

Wanted Salesmen

covering telephone, electric power, electric railway or sub-stations to take on our product as a side line. State references and territory covered. Page Engineering Co., 1305 S. Townsend, Syracuse, N. Y.

LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Electric Railway Journal, published weekly at New York, N. Y., for Oct. 1, 1926,

State of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared C. H. Thompson, who, having been duly sworn according to law, deposes and says that he is the Secretary of McGraw-Hill Publishing Company, Inc., Publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Mc-McGraw-Hill Publishing Company, Inc., 10th Ave. at 36th St., New York, N. Y. Editor, Charles Gordon, 10th Ave. at 36th St., New York, N. Y. Managing Editor, Morris Buck, 10th Ave. at 36th St., New York, N. Y. Business Manager, L. F. Stoll, 10th Ave. at 36th St., New York, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) McGraw-Hill Publishing Company, Inc., 10th Ave. at 36th St., New York, N. Y. L. D. & A. J. Baldwin, Trustees, 27 Pine St., New York, N. Y. A. J. & L. D. Baldwin, Trustees, 27 Pine St., New York, N. Y. The Grosvenor, Inc., 27 Pine St., New York, N. Y. H. W. Blake, 10th Ave. at 36th St., New York, N. Y. F. R. Low, 10th Ave. at 36th St., New York, N. Y. Mason Britton, 10th Ave. at 36th St., New York, N. Y. Anne Hugus Britton, Hill Building, New York, N. Y. Grace W. Mehren, 53 Fairview Ave., So. Orange, N. J. J. Malcolm Muir, Trustee, 10th Ave. at 36th St., New York, N. Y. D. C. McGraw, 10th Ave. at 36th St., New York, N. Y. J. H. McGraw. 10th Ave. at 36th St., New York, N. Y J. H. McGraw, Jr, 10th Ave. at 36th St., New York, N. Y. C. W. McGraw, 370 Seventh Ave., New York, N. Y. H. W. McGraw, 10th Ave. at 36th St., New York, N. Y. J. H. McGraw, J. H. McGraw, Jr., and Malcolm Muir, Trustees, 10th Ave. at 36th St., New York, N. Y. F. S. Weatherby, 271 Clinton Road, Brookline, Mass. E. S. Wilsey, 10th Ave. at 36th St., New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

McGRAW-HILL PUBLISHING COMPANY, INC.
C. H. THOMPSON, Secretary.

Sworn to and subscribed before me this 29th day of Sept., 1926.

[Seal.] MARTIN J. WIEMER.

Notary Public Queens County Certificate No. 1819. Certificate filed in New York County No. 272.
(My Commission expires March 30, 1928.)

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built

West. 508 or G.E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Air Receiver & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Graybar Electric Co., Inc.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Door Equipment
Manganese Steel Forge Co.

Automatic Regulators Voltage Current Synchronizing
American Brown Boveri Elec. Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
St. Louis Car Co.
Standard Steel Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Front
Shuler Axle Co.

Axles (Front & Rear) Motor Truck & Passenger Car
Timken-Detroit Axle Co., The

Axles, Steel
Carnegie Steel Co
Johnson & Co., J. R.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co., The

Babbitt Metal
Ajax Metal Co.
Johnson & Co., J. R.
More-Jones Brass and Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Baggage Checks
Globe Ticket Co.

Batteries, Dry
National Carbon Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
More-Jones Brass and Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Ball
Norma Hoffman Bearing Corp.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A

Bearings, Roller
Norma Hoffman Bearing Corp.
Timken Roller Bearing Co.

Bells & Buzzers

Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.
Graybar Electric Co., Inc.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Baker-Raulang Co., The
Cummings Car Coach Co.

Bodies, Passenger Car
Baker-Raulang Co., The

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co

Bolts, Nuts, Rivets
Russell, Burdsall & Ward Bolt Nut Co.

Bolts-Nuts Track
Illinois Steel Co.

Bolster Hanger Wire Plates
Manganese Steel Forge Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Graybar Electric Co., Inc.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Graybar Electric Co., Inc.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Graybar Electric Co., Inc.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Blocks (Bus)
American Brake Material Corp.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
National Carbon Co.
Westinghouse E. & M. Co.

Brushes, Graphite
National Carbon Co.

Brushes, Metal Graphite
National Carbon Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Brushholders
Columbia Machine Works

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co
Heywood-Wakefield Co.

Bus Wheels, Steel
Heywood-Wakefield Co.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Bros.
International Harvester Co.
St Louis Car Co.
Studebaker Corp. of America

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Carbon Paste, Welding
National Carbon Co.

Carbon Plates, Welding
National Carbon Co.

Carbon Rods, Welding
National Carbon Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. &. M. Co.

Car Steps
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The, J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas, Rail
Brill Co., The, J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car and Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The, J. G.
General Electric Co.

Cash Fare Receipts
Globe Ticket Co.

Castings, Brass Composition or Copper
Ajax Metal Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Brake Shoe & Foundry
American Steel Foundries
Bemis Car Truck Co.
St. Louis Car Co.
Standard Steel Works

Castings, Malleable and Brass
American Brake Shoe & Foundry
Bemis Car Truck Co.
St. Louis Car Co.

Castings, Nichrome
Driver-Harris Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.
Graybar Electric Co., Inc.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Chafing Plate
Manganese Steel Forge Co.

Chairs, Parlor Car
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Circuit Breakers (Oil)
American Brown Boveri Elec. Corp.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E & M Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co The J G.
Cincinnati Car Co.
Ohio Brass Co.
Root Spring Scraper Co.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Economy Electric Devices Co.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co
International Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Graybar Electric Co., Inc.
Ingersoll-Rand Co.
Sullivan Machinery Co.
Westinghouse Tr. Br. Co.

Compressors, Gas
Sullivan Machinery Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

Compressors, Portable
Sullivan Machinery Co.

Condensers
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Amer. Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works
Silver Lake Co.

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Elec. Service Supplies Co.
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Wood Co., Chas. N.

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Globe Ticket Co.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cranes, Electric, Industrial Truck Mounted
Baker-Raulang Co., The

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantasote Co., Inc.
St. Louis Car Co.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co

Dealer Second Hand Rails
Electric Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P Edward

Door Operating Devices
Brill Co., The J G
Consolidated Car Heating Co.
Safety Car Devices Co.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co
St. Louis Car Co.

Doors, Folding Vestibule
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Graybar Electric Co., Inc.
Railway Trackwork Co.

Electric Locomotives
St. Louis Car Co.

Electric Refrigerators, Car
Phoenix Ice Machine Co.

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Amer. Electrical Works
Amer. Steel & Wire Co
Graybar Electric Co., Inc.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

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Bibbins, J. Rowland
Brennan, F. J.
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
A. L. Drum & Co.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly, Cooke & Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engineers, Inspecting, & Chemists
Pittsburgh Testing Laboratory

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse E & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Economy Electric Devices Co.
Cleveland Fare Box Co.
Johnson Fare Box Co.
Nat'l Ry. Appliance Co.
Ohmer Fare Register Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Root Spring & Scraper Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Fire Extinguishers
Pyrene Mfg. Co., The

Flashlights
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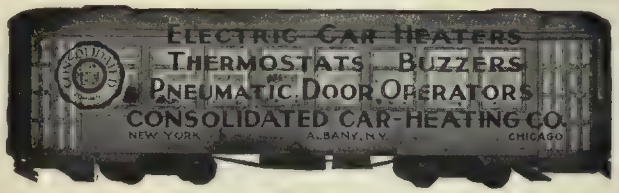

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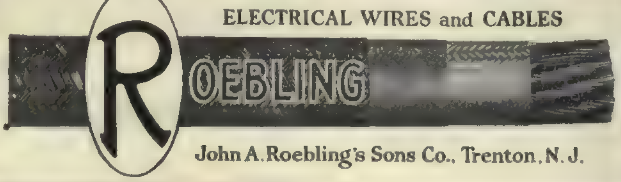

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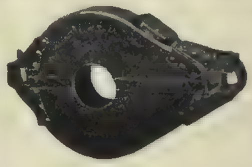

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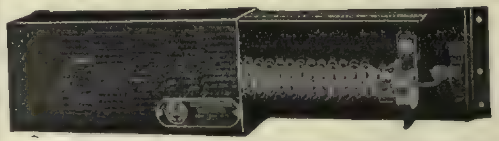

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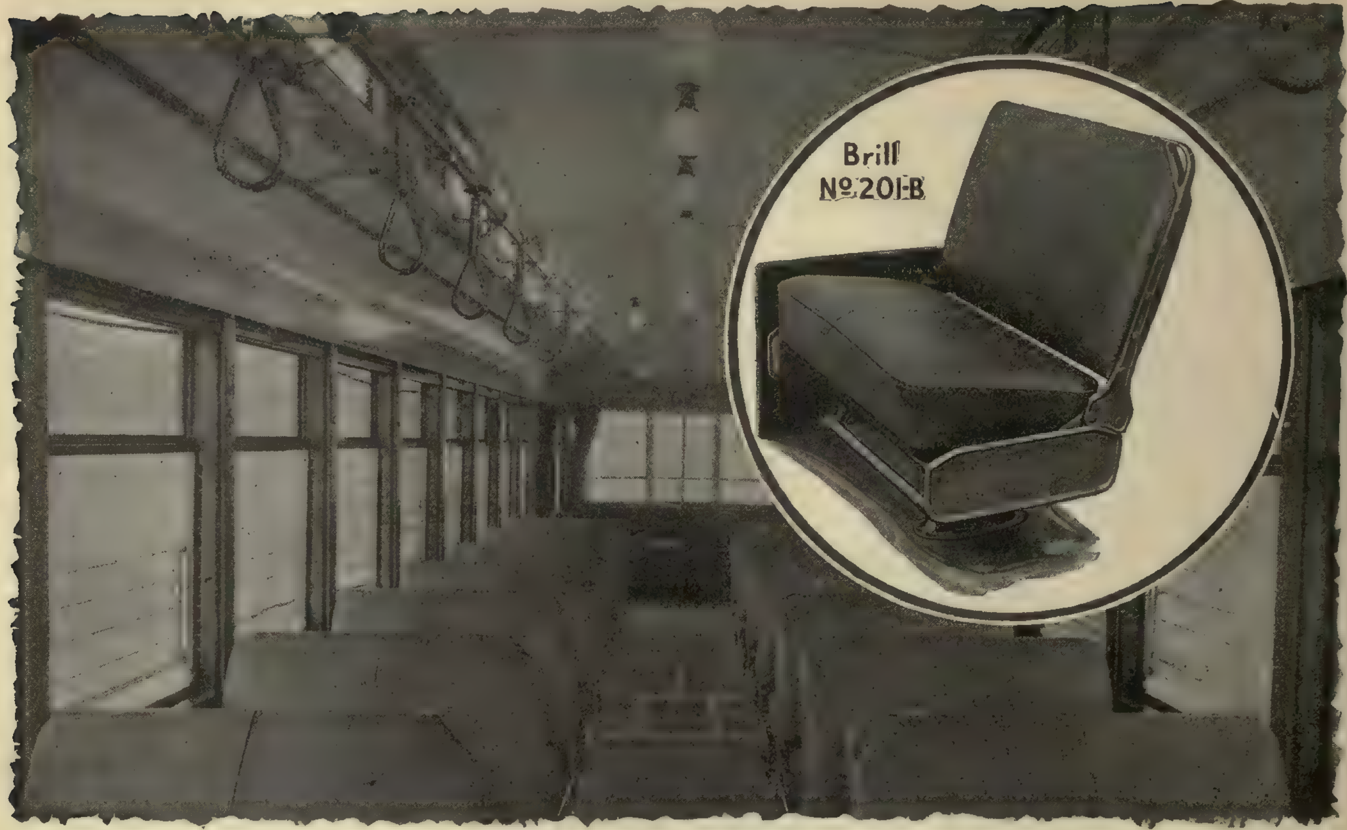


The fifteen new cars recently furnished the Washington Ry. & Elec. Co. were equipped with Brill No. 201-B Seats.

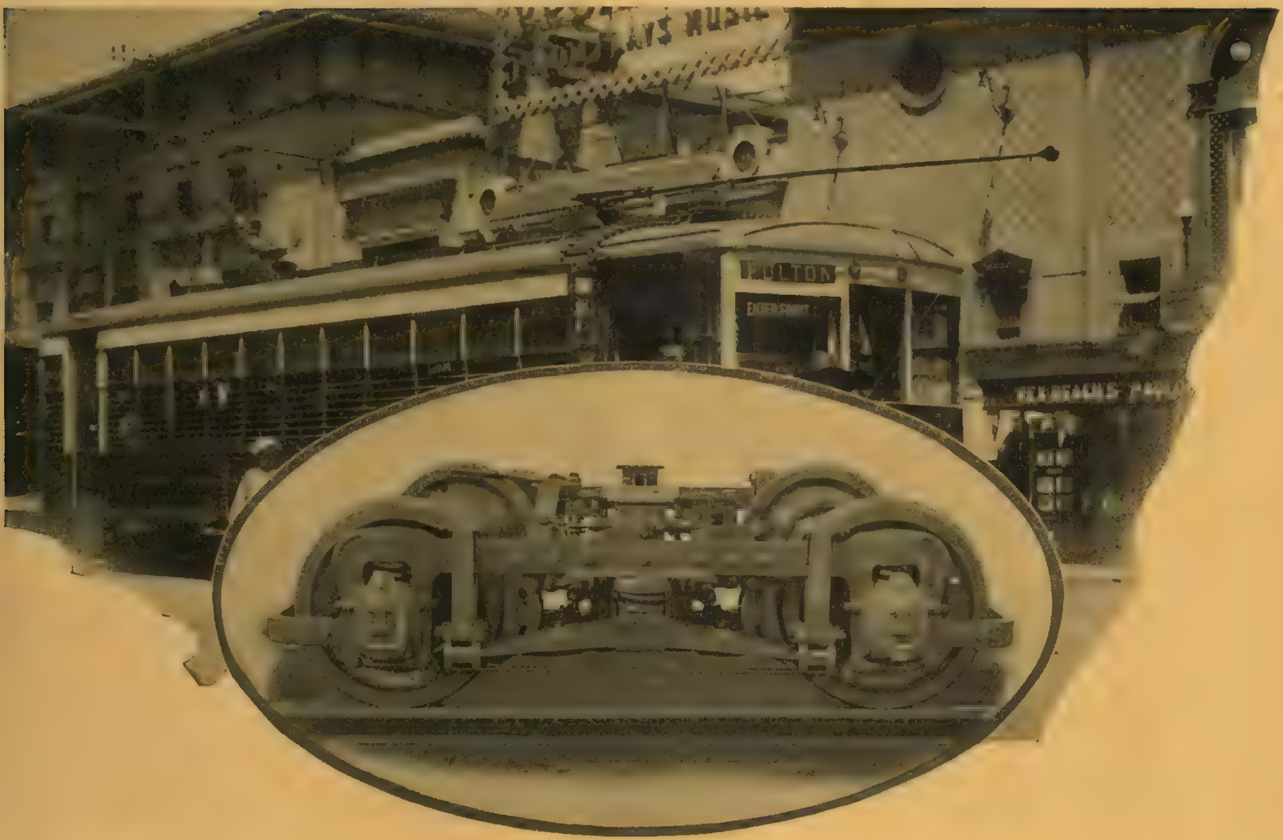
Seat Comfort will attract passengers, too

Modern Cars

An improved type reversing mechanism, which permits a slope of the cushion and pitch to the back affording unusual comfort was specially designed for this Brill No. 201-B type seat for double-end modern cars. Deep spring genuine leather upholstered cushion and back add to its attractiveness, a factor in stimulating increased passenger revenue. Sturdily built, like all Brill seats.

Write for Seat Catalog No. 284.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.



The fifteen double truck safety cars, built by the American Car Co. for Virginia Elec. & Pwr. Co., were mounted on Brill 177-E-1 trucks equipped with Twin Links.

Modern Cars

require trucks—the result of progressive development

Solid-forged sideframes have been the foundation of the Brill truck system for years. They impart strength and durability to the truck's construction and result in long life and low maintenance. In designing the No. 177-E type for light-weight modern car service a type of solid-forged frame was developed which, while light in weight, lacks none of the strength for which the heavier sideframes are noted.

With this foundation and other important features such as the Graduated Spring System, Bolster Guide, Half-ball Brake Hangers, and Twin Links, this type truck represents years of progressive development, and provides that smooth and comfortable riding action in keeping with modern electric car requirements.

THE J. G. BRILL COMPANY
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Electric braking

Only Gas-Electrics have this extra brake

Operation of the Gas-Electric Bus is more simple, and much less fatiguing than any mechanically-driven bus. Arrow shows the convenience of electric braking controller

In addition to the regular pedal-operated service brake, and a hand-lever emergency brake, Gas-Electric Buses have the unique advantage of electric braking, which is effected by the simple operation of a controller handle. On long, steep grades this method saves wear on brake bands, and provides a positive uniform retarding force, against which the bus cannot get out of control. It is also available as an emergency brake under any operating condition.

Consider this, together with the many other demonstrated advantages of electric drive—simplicity, faster acceleration, smoother operation, and elimination of transmission gears and clutch.

General Electric Equipment for gas-electric buses has been developed to practical perfection, as is attested by numerous installations from coast to coast.

(At right) One of the fifteen Gas-Electric Buses, all G-E equipped, which are operated by the Atlanta Coach Company

When considering the purchase of buses for comfortable riding, safety, economy of operation, and long life, it will pay to investigate the success of buses equipped with General Electric gas-electric drive. This equipment is available in single or two-motor types and is adaptable to any standard chassis.

590-3C

GENERAL ELECTRIC

ENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK SALES OFFICES IN ALL PRINCIPAL CITIES

NEXT WEEK
MAINTENANCE AND CONSTRUCTION ISSUE

McGraw-Hill Publishing Company, Inc.
October 16, 1926
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ELECTRIC RAILWAY JOURNAL

Collier Service

Because car cards stimulate trade—and trade is the basis of traffic, they are a working asset of the transportation company. Their value in this respect, however, is dependent on the resources of skill and experience at the command of the organization that makes the cards.

The creation and maintenance of your card advertising space values should be placed only in the hands of those best equipped to handle all phases of this highly specialized work.

Barron G. Collier Inc.
Candler Bldg., New York

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Then sweepers and plows equipped with amply applied modern Westinghouse motors and control save a lot of schedule delays, expense and worry.

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Cars and trains can be operated over well-cleared ways with minimum schedule delays and equipment abuse due to "bucking" snow.

Adequate equipment saves wear and tear, worry, and overtime expense on the entire operating staff.

These reliable Westinghouse motors for this application are available for immediate shipment.

Type 532-B	—50 hp.
Type 306 CVD 4	—65 hp.
Type 535-B	—60 hp.

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East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

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It Pays

WESTINGHOUSE ELECTRIC

to Buy Renewal Parts

from the Original Manufacturer

Here is what one railway* learned about maintenance of equipment:

> "In connection with material, we have found that it is usually cheaper to buy replacement parts than to make them in our shop. The average street railway shop cannot compete with an industrial institution which operates on a production basis, and even if the cost is slightly higher, it pays to purchase most parts from the original manufacturer. When we begin to manufacture parts on a large scale, the actual maintenance supervision, which is our primary job, usually suffers. By buying from the manufacturer, we take advantage of the engineering necessary to perfect the part. Frequently an apparently insignificant change may become later the source of a great deal of trouble."

* R. W. Bailey, Superintendent of Power
and Equipment, Kansas City Railways,
in Electric Railway Journal, July 17, 1926.

Westinghouse maintains a special renewal parts factory and a competent engineering staff engaged in the production of dependable renewal parts from original manufacturing information and on a large scale. In the thoroughly modern Homewood Works, Westinghouse parts are *economically*—but not cheaply—manufactured; true economy lies in dependability.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA
1926

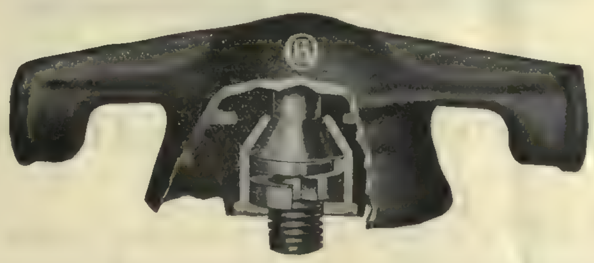
Westinghouse

X90018

Famous for Service-the Big 4

Marathon Trolley Ears

SHEER MERIT, demonstrated by unrivaled records of service—in some instances 420,000 car passes and over—has made O-B Marathon Trolley Ears the choice of Line Superintendents on every property where used. Besides giving from two to three times the service formerly expected of trolley ears, O-B Marathons eliminate wire wear under the ears and materially reduce the number of line breaks. Every Marathon on the line means money saved.



Type N Lock Hanger

THOUSANDS of O-B Type "N" Lock Hangers in service on many properties have demonstrated the dollars and cents value of its special steel spring washer construction. A permanently tight joint between hanger and ear is made by simply screwing the ear onto the hanger stud. No backing off of the ear is necessary to secure alignment with the trolley wire. This eliminates trouble and rapid depreciation—insures greatly increased service.

BC Frog

CLOSE to half a million car passes is the average reported by five properties using O-B Type "BC" Trolley Frogs. Many individual "BC" Frogs gave even longer service: one lasted for 652,500 car passes before it was replaced. The big reason for long life is the close coupled center construction, which permits the trolley wheel to ride on its groove from end to end. There is no wear on the pan. This frog can be placed farther out of the curve, reducing wire wear.

C Splicer

THE PREFERENCE shown by scores of Line Superintendents for the Type "C" Splicer has made it the largest seller in the O-B line of Splicers. Repeat orders have come from every property on which it has been used. Its narrow cross section, low center of gravity, strength and durability of the metal, combine in giving a permanently straight, smooth underrun. All of which means long, trouble-free service. Wire enters in a straight line. Easily installed.

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg Co., Limited
Niagara Falls. Canada
2208

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Variable Load Brakes for Canada!

gives
Uniform Braking
with
Varying Load

One of Canada's progressive traction properties, the Montreal Tramways Company, is now putting into service fifty new city cars that are equipped with such modern devices assuring the fullest measure of operating safety and efficiency.

The Westinghouse Variable Load Brake is among these important devices.

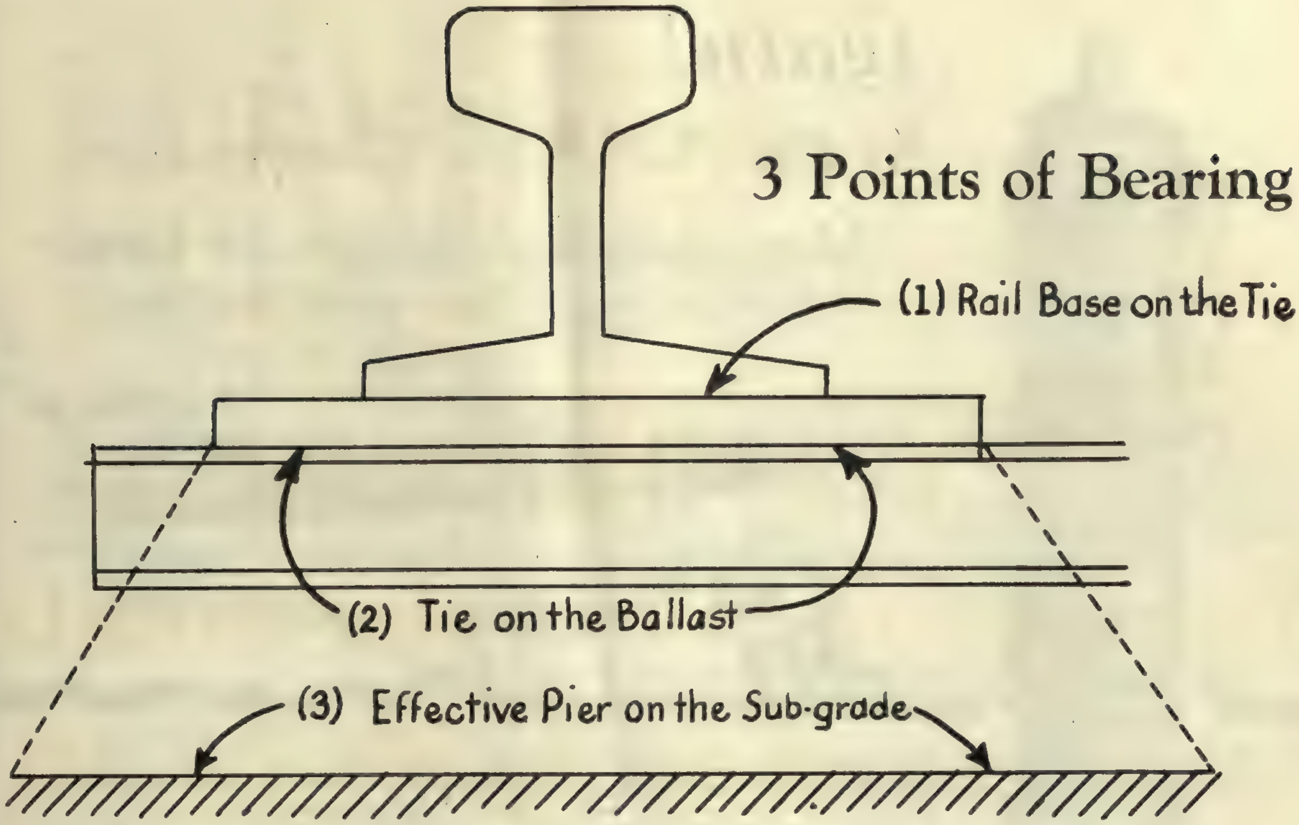
This equipment eliminates the difference in retarding effect on empty and loaded cars—by an automatic adjustment of brake cylinder pressure with the changing load—and assures that stops will be as short under all conditions as would normally be possible only on an empty car. The uniformly short stops are translated into the important advantages of greater safety and speedier schedules.

The Variable Load Brake will therefore share in safeguarding and expediting the movement of traffic over this important transportation system.

Confer with our representative regarding the desirability of Westinghouse Variable Load Brakes for *your* new cars.

Westinghouse Traction Brake Company
General Office and Works: Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES



Check These Three Bearing Points

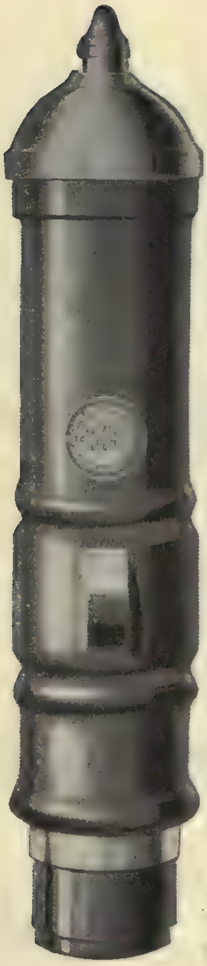
STEEL Twin Ties are well known for their large effective bearing, a feature of their efficient design and the secret of the long life, low initial cost and success of this construction. Notice and use for comparison the actual figures of Twin Tie Bearing in the table on the right.

Twin Ties on 6′0″ Centers	Square Inches
(1) Rail Base on Tie (assumed 6″ base)	216 50% Rail Base Supported
(2) Tie on the Ballast	936
(3) Effective Pier on the Subgrade	2700

The International Steel Tie Company
Cleveland

Write today for catalog, detailed cost figures from many installations and delivered price on Twin Ties.

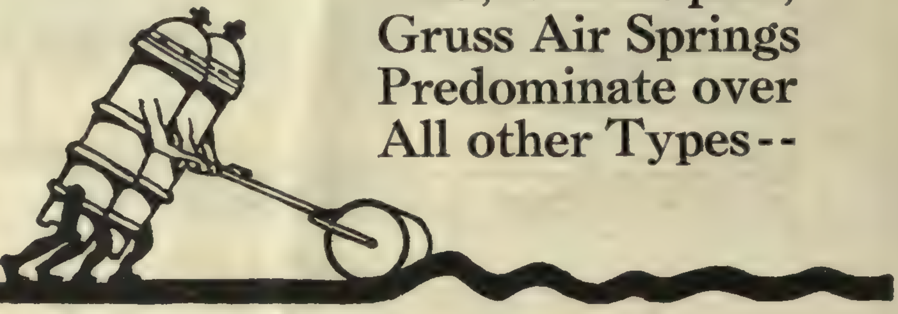
Steel Twin Tie Track



Again!

At the A.E.R.A. Convention

More Buses equipped with Gruss Air Springs than ever before



And, as in the past, Gruss Air Springs Predominate over All other Types--

HISTORY repeats itself. The A.E.R.A. Convention was another convincing demonstration of the popularity of air springs and of Gruss Air Springs in particular.

As a matter of fact it was Gruss Air Springs that won the bus operators to the air spring idea. It was Gruss that proved, in actual use, that air springs do absorb road shock and vibration.

And everywhere bus operators have actual records to prove that this means less breakage and repair bills—longer life for chassis and body—greater patronage because of supreme riding comfort.

That's why hundreds of bus operators now specify Gruss Air Springs on all new equipment; why thirteen different manufacturers of buses and trucks now offer Gruss Air Springs as either optional or standard equipment.

This preference for Gruss is due to the superior mechanical construction of Gruss Air Springs.

For instance, Gruss are the only Air Springs that actually check the recoil of the original steel springs by hydraulic means supplemented with a vacuum.

Again—the air chamber in Gruss Air Springs is above the piston head. That means direct action and quicker recovery.

That is why Gruss Air Springs insure a riding comfort absolutely impossible to obtain with any other type of shock absorber equipment.

The sliding member in Gruss Air Springs has seven times as great a bearing surface as that of any other air spring on the market. That is one reason why Gruss Air Springs outlast all other makes of air springs.

Again—Gruss has only two moving parts. These are bolted together and move together in the same direction. There are no joints, bypasses, ports or adjustments to get out of order.

That is why Gruss requires less attention than any other type of air spring.

With Gruss equipment the shackle bolt of the steel spring is in direct line with the sliding sleeve or moving member of the air spring. Thus the weight of the bus is carried exactly in the center of the air spring directly over the original steel spring eye. All Gruss Air Springs are machined to specifications of original steel springs. There is no carrying the weight of the bus on offset connector. The original steel spring suspension is not changed a particle.

Thus, there is no chance of side thrust causing binding and wearing. Free, quick, smooth action is assured continuously regardless of how "tough" road conditions are.

The Gruss Brackets are steel castings. That insures the greatest possible strength.

Another decided advantage of Gruss is the unit assembly. It insures quick, economical repairs in case of breakage due to accident.

These are just a few of the reasons why hundreds of bus operators all over the country have found that Gruss Air Springs function better and cost less for maintenance than any other type of shock absorbing equipment.

We welcome the opportunity of presenting all the facts to you in person.

The CLEVELAND PNEUMATIC TOOL COMPANY, Cleveland, Ohio
Service Facilities in Over 350 Cities

GRUSS AIR SPRINGS

for Trucks, Buses
Passenger Cars ~

A familiar scene in many of the larger cities, where attractive buses with Bender-built bodies and Hunter Signs are popular!

Unquestionably a public conveyance!

—that's the business touch which Hunter Signs give to the motor bus

By day or night Hunter Signs "Tell the Public where you're going." Reliable bus companies operating on fixed routes and schedules sell the public their transportation service by means of Hunter Signs They are made in types for every service.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Building

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

What SUPERTWIST Adds to Goodyear Tires

One of the Northland Transportation Company's Goodyear-equipped buses; insert of Goodyear Pneumatic Bus Tire

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

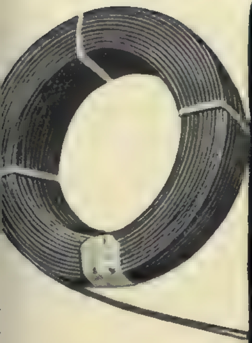
These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

Goodyear Means Good Wear

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.



Power knows no nightfall

DAY and night the central stations that dot the country continue their never ceasing round of production. Across mountains and valleys, through open fields and crowded city streets, copper highways take up the burden—carrying light and power to millions of homes and thousands of industrial plants.

The responsibility of the wire manufacturer is clear cut—he must build a product that can take its place as one of the strongest links in this great service chain, a responsibility that the Rome Wire Company has always accepted.

Every Rome wire, from the huge transmission cables to the tiny strands of copper used in the most delicate precision instrument, is produced in Rome Mills, under Rome supervision, from wire bar to finished copper wire. For only in this way can quality be guaranteed, and the industry be assured of uninterrupted service.

Stranded Double Braid Rubber Covered Wire

ROME WIRE COMPANY, ROME, N.Y.

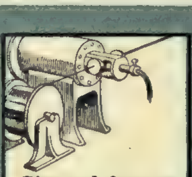
ROME WIRE

FROM WIRE BAR TO FINISHED COPPER WIRE

Antenna Wire

Weatherproof Wires and Cables

Trolley Wires and Cables


Tinned Copper Wires and Cables

Telephone Wires and Cables

YEARS of investigation and analysis are behind the insulation compounds used with Rome Rubber Covered Wires. The result is an insulation of high dielectric strength, combined with remarkable aging qualities.

In the same way, all Rome Wires and Cables are backed by twenty years of manufacturing experience, and an organization composed of men who have made a life-time study of the construction and use of all types of wire.

All these facilities are under one centralized control, assuring you of ample stocks, quick shipments, and competitive prices.

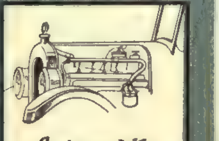
If you will let us know what wires and cables, shown on this page, you are interested in, we will be glad to send you samples, catalogs, and other information that will be of help to you—while an opportunity to quote on any of your wire requirements will always be welcome.

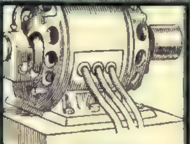
ROME WIRE COMPANY

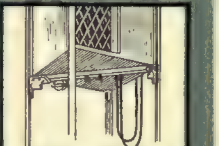
Mills and Executive Offices: ROME, N.Y.

Diamond Branch: Buffalo, N.Y.

New York—50 Church Street
Boston—1011 Little Building
Chicago—14 E. Jackson Blvd.
Detroit—25 Parsons Street
Cleveland—1200 W. 9th Street
Los Angeles—J. G. Pomeroy, Inc., 336 Azusa Street
San Francisco—J. G. Pomeroy, Inc., 51 Federal Street

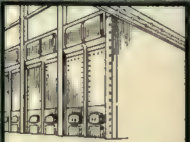

Automobile Wires and Cables


Feeder Cables


Extra Flexible Wires and Cables

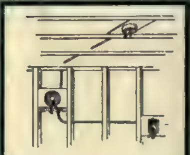
Heater Cords

Lamp Cords

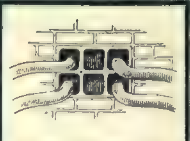

Slow Burning Wires

Super Service Cords and Cables

Rubber Covered Wires—Code 30% Intermediate

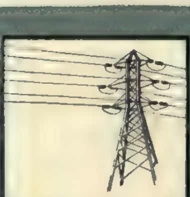

RomeX Cable

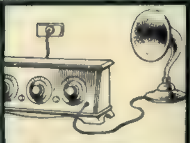
Copper Rod and Bare Copper Wire

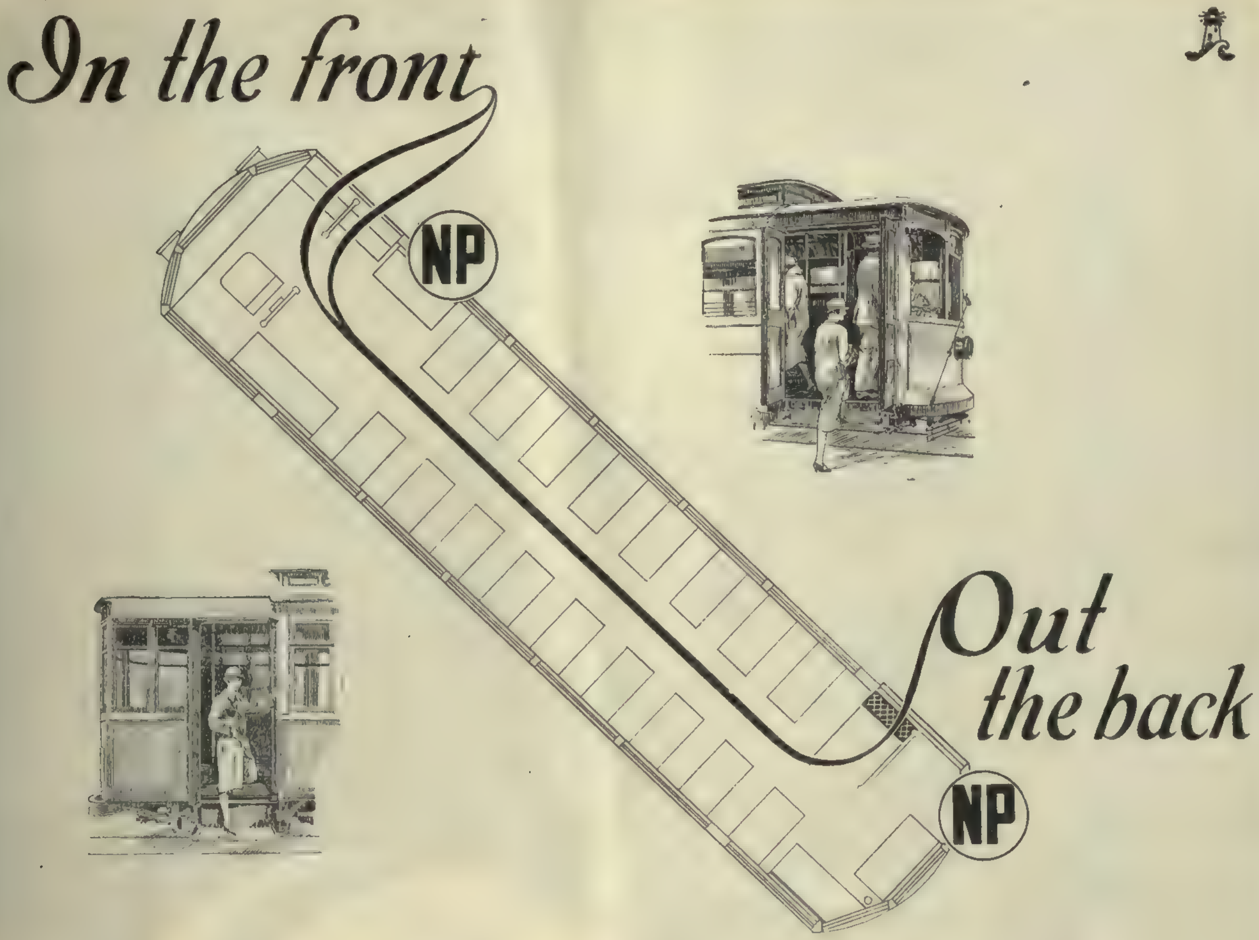

Lead Sheathed Cables

Magnet Wire

Mining Machine Cables


Power Cables


Radio Wires and Cables



What "Circulating Load" Has Done for the Street Railways

CIRCULATING load provides the only practical means of handling heavy traffic without blocking and congestion on the part of boarding and alighting passengers. The adoption of this system, however, called for a new method of controlling doors. The National Pneumatic Company has met this need with the Automatic Treadle Exit Door.

National Pneumatic Company

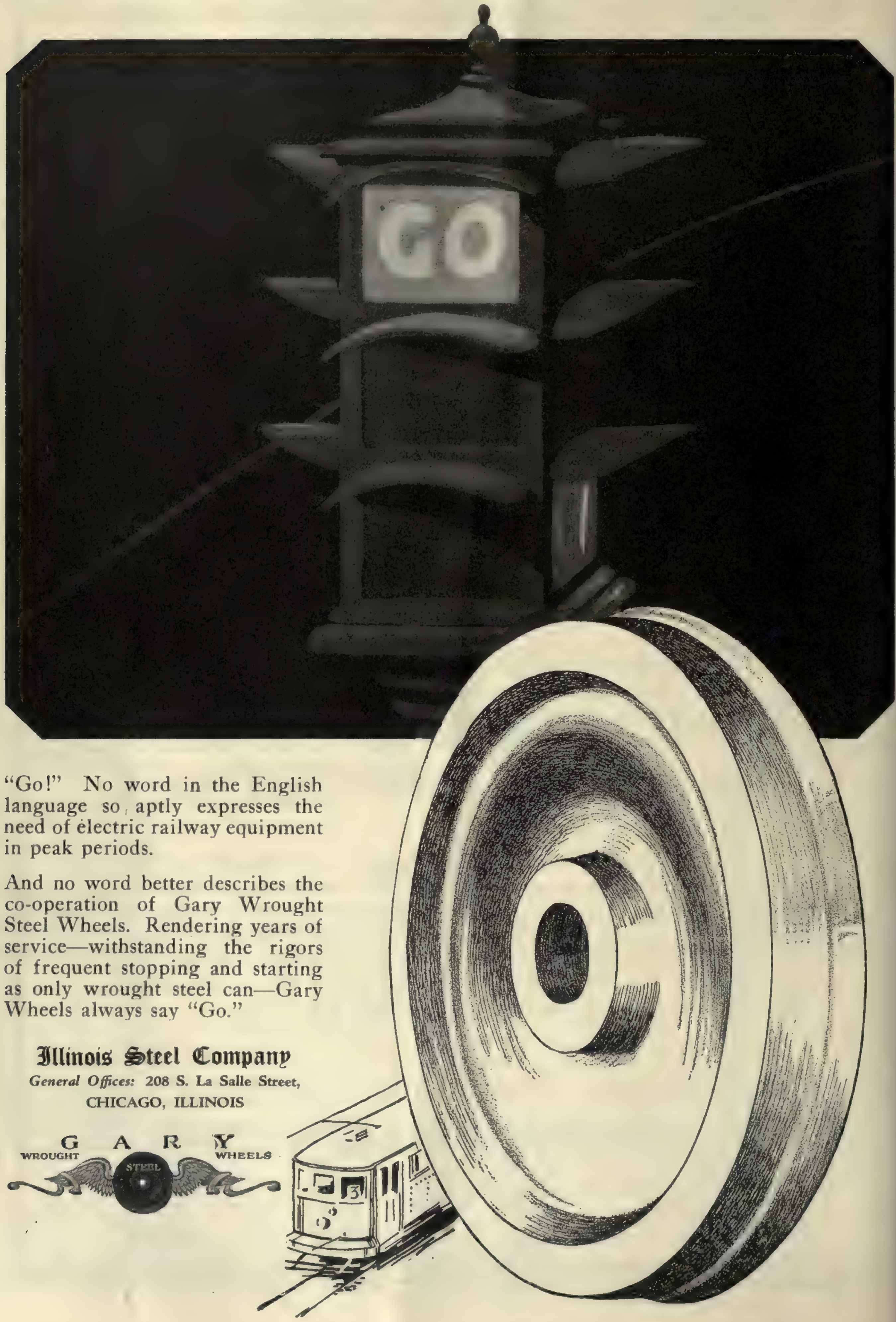
Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



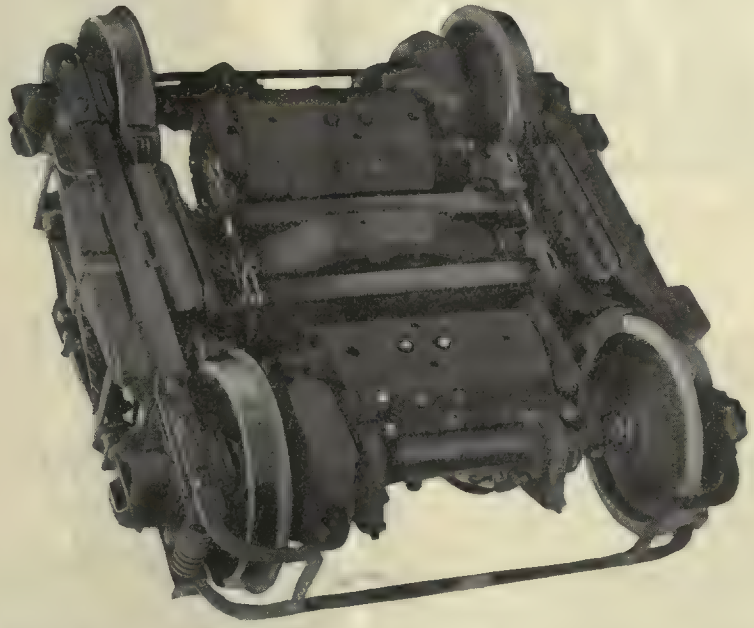
"Go!" No word in the English language so aptly expresses the need of electric railway equipment in peak periods.

And no word better describes the co-operation of Gary Wrought Steel Wheels. Rendering years of service—withstanding the rigors of frequent stopping and starting as only wrought steel can—Gary Wheels always say "Go."

Illinois Steel Company
General Offices: 208 S. La Salle Street,
CHICAGO, ILLINOIS

GARY
WROUGHT STEEL WHEELS

BALANCED DESIGN



The first practical application of DUPLEX air and magnetic brakes

"From 60 miles an hour to stop in 800 feet"

Cincinnati has taken the most up-to-date of all braking equipment,—the perfected magnetic track brake,—and combined it with the air brake in a unique interlocked and automatically functioning system.

In actual tests such equipment decelerated a 19-ton car from 60 mph. to full stop in less than 800 feet, and in a period of 14 seconds.

Never before had such a thing been done. Trucks and suspension had to be radically re-designed, but the result is perfect BALANCE between speed and stopping power,—comfort, ease of riding and SAFETY.

It is typical of the real meaning of BALANCED DESIGN to the operator looking for new cars that are *really* new,—*really* capable of attracting patronage in the face of modern competition.

Actual operating data gladly furnished on request.

THE CINCINNATI CAR COMPANY
CINCINNATI, OHIO

CINCINNATI
New
CARS

A step ahead of the modern trend

OCTOBER—

an *Important* month to Lubricating Engineers

—*and this is why:*—

Each year, at this time, Electric Street Railways have to meet certain operating conditions which have a seasonable phase.

Being in the Oil business, *we'll* stick to *that* end of it.

That is why we impress upon you that now is the time to begin changing your lubricants to meet weather conditions.

There is a good reason for this:

All oils tend to become a little thicker, a little sluggish, in colder weather.

The viscosity (fluidity or body) of all oils varies with temperature. In the application of lubricants to street cars it is the operating temperature that counts. As the weather gets colder, the oils you used all summer will thicken. They will not feed as freely. You can't change the temperature, but you can *change the oils* to compensate.

But weather doesn't change at a given date, so here's what we recommend:

Compensate gradually. Begin now (about the middle of October) adding steadily small quantities of lighter oils to the lubricants now on the cars. This will gradually lower the viscosity, keeping it normal all the time as winter comes.

Begin now, changing over to

TEXACO *WINTER* ELECTRIC CAR OIL
TEXACO *WINTER* AIR COMPRESSOR OIL
TEXACO *WINTER* GEAR LUBRICANT

Then all the time, even in the middle of winter, you will be fully protected by these carefully refined lubricants.*

We have worked out an interesting and economical technique on roads all over the country and shall consider it a privilege to have our TEXACO Lubrication Engineers discuss it with you in person.

As our stations are already stocked with the Winter Lubricants, we are amply prepared to handle your order for them now.

And remember, there is a TEXACO Lubricant for every purpose; for rolling stock or power plant—everywhere along the line.

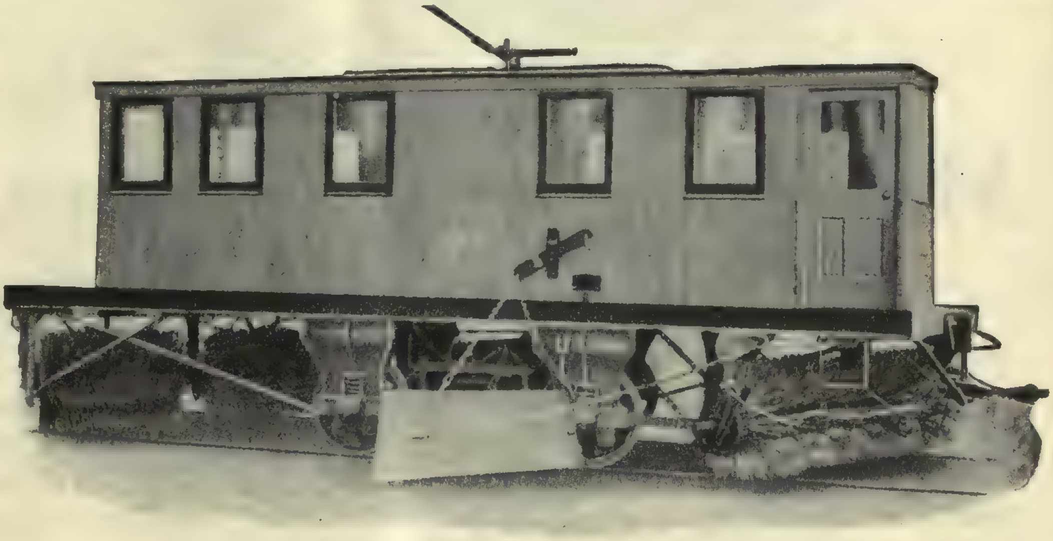
* In spring, reverse the Process, gradually raising the initial viscosity of the lubricants so that, under the heat of summer, the oils will "fall back" to their original fluidity.

TEXACO T REG. U.S. PAT. OFF.

THE TEXAS COMPANY
DEPT. R-J. 17 BATTERY PLACE . NEW YORK CITY
HOUSTON . CHICAGO . NEW YORK
OFFICES IN PRINCIPAL CITIES

TEXACO T REG. U.S. PAT. OFF.

Now is the time to check up on your snow-fighting equipment for the coming winter



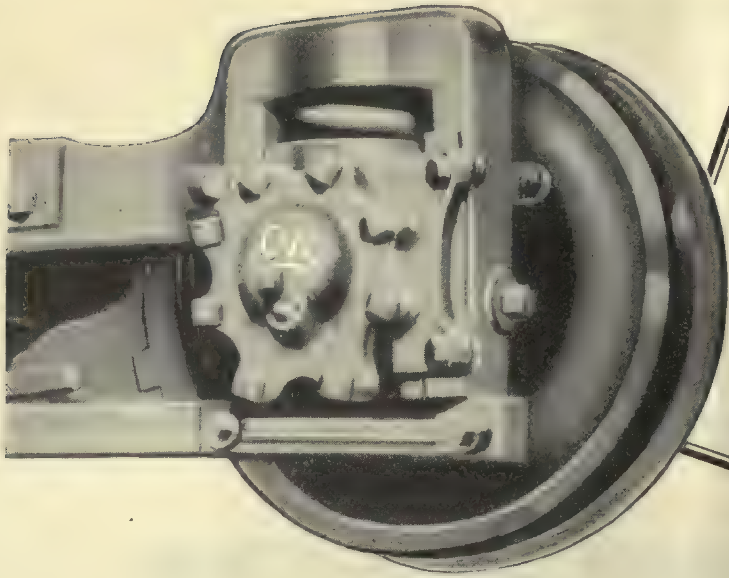
The standard single truck, steel underframe, long broom sweeper is exceptionally strong and rigidly built, handling deep snow rapidly without stalling. The long broom clears both rails and additional fifteen inches outside of each track. These sweepers are equipped with new design ROLLER BAR steel chain with tensile strength of 28,000 pounds, entirely eliminating chain breakage.

Maximum EFFICIENCY and FLEXIBILITY with minimum maintenance is obtained with CHAIN DRIVEN BROOMS.

McGuire-Cummings Single and Double Truck Snow Sweepers and Plows are "Standard Equipment" on practically every Electric Street Railway Line in the United States and Canada that has snow to contend with.

CUMMINGS CAR AND COACH CO.

Successor to McGuire-Cummings Mfg. Co.
111 W. Monroe St.
CHICAGO



O.K. for a longer period ~

no pull-ins for journal trouble

Maintaining the modern car made easier and cheaper

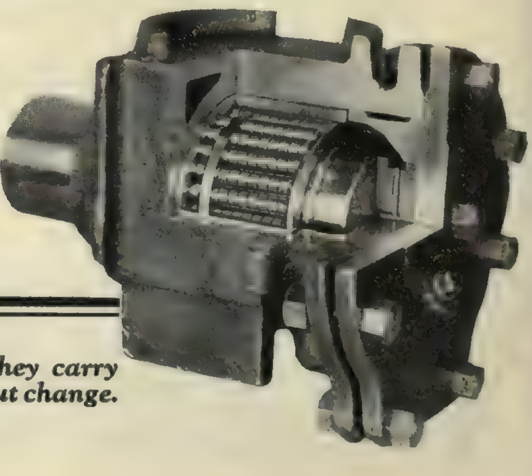
THE basis of reduced maintenance is the positive clean lubrication obtained with Hyatt Roller Bearings. Sealed in oil-tight journal boxes, the lubricant can neither leak nor become dirtied by grit or foreign matter.

Helical rollers, wound right and left hand and assembled alternately, evenly distribute oil to every part of the bearing surface, as long as the oil level in the box touches the roller assembly.

With positive lubrication, hot boxes are eliminated and other journal bearing maintenance is reduced to a minimum. The lid is bolted tight to the box, and no waste or other packing is used.

Pull-ins for journal trouble are practically unknown. In fact, all maintenance on trucks is reduced to checking for loose bolts, and lubrication at intervals, which are less frequent than with ordinary bearings. Let our railway department send you further details. *Hyatt Roller Bearing Company, Newark, N. J.*

HYATT
ROLLER BEARINGS



Hyatt Roller Bearings meet every A. E. R. A. requirement. They carry full standard loads in boxes which fit all standard trucks without change.

Round the Country with

"Bridgeport"
BRASS CO.
TRADE MARK
Phono-Electric

Where traffic is heaviest in LOUISVILLE they use Phono-Electric

For a long time now we've been claiming that "the most progressive cities throughout the country use Phono."

Here's a good example—Louisville, Kentucky!

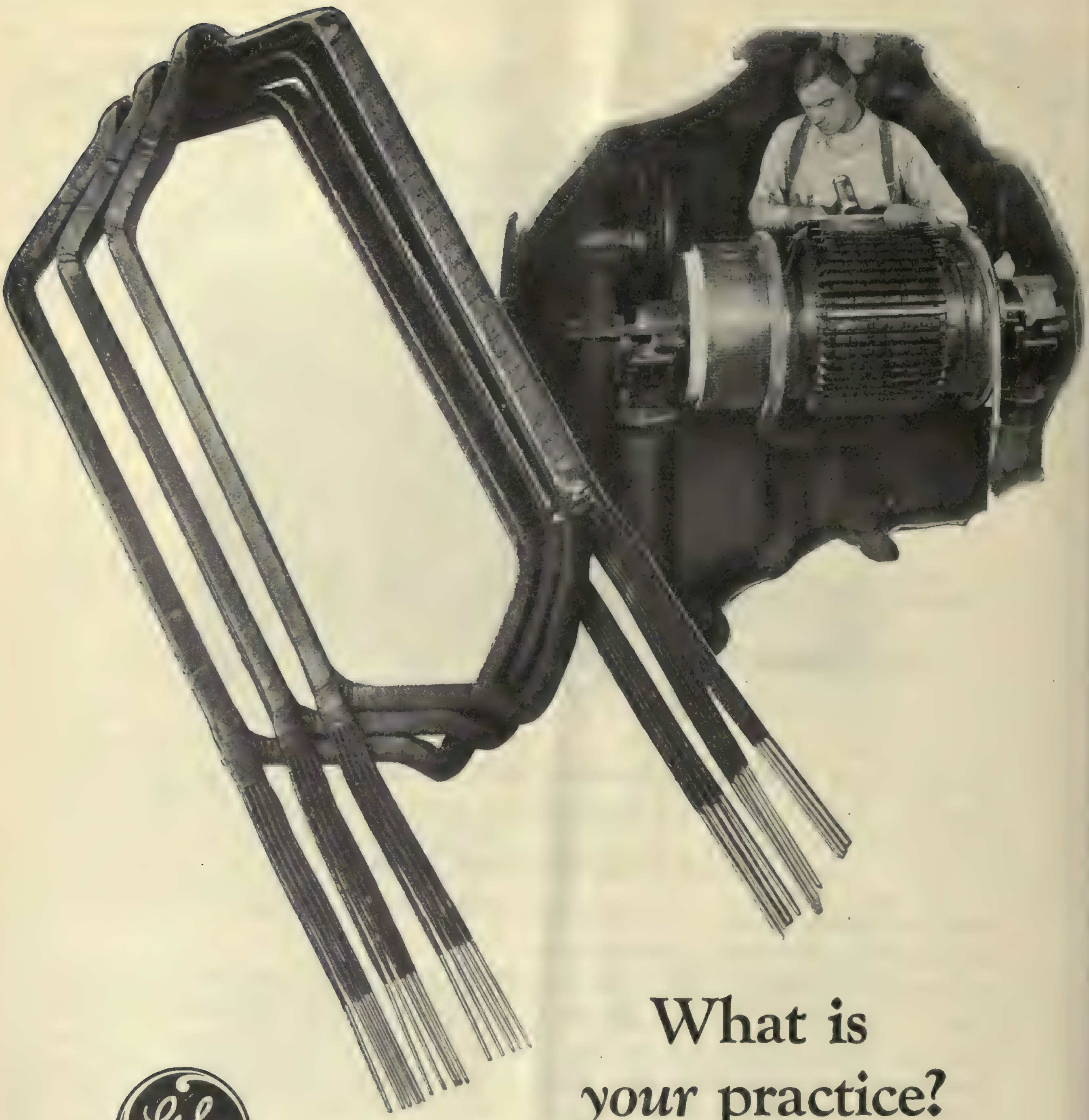
Our photograph shows Louisville's fine Federal Building and the intersection of the 4th Street and Chestnut Street trolley lines. Traffic on this 4th Street route is very heavy, with three lines operating over the tracks through the heart of the retail and residential districts, and two of them continuing to the famous Iroquois Park, eight miles away.

All of the trolley wire on this heavily travelled artery is Phono-Electric—chosen because it consistently outwears hard-drawn copper two to three times, and because its greater tensile strength permits a higher percentage reduction in cross-section before renewal. Some of this wire has been up now for nearly 15 years.

Better let us send you the book of "Phono Facts," taking up the matter of wearing qualities, tensile strength, resistance to fatigue, conductivity and other important factors, in detail.

Bridgeport Brass Company
BRIDGEPORT - CONNECTICUT

Phono-Electric
Trolley Wire



What is *your* practice?

The cost of coils is only a part of the cost of armature rewinding. The winder's time and other labor must be considered. A small saving in first cost of the coils inevitably is more than offset by frequent rewinding with inferior coils.

The rewinding of G-E Motors to make them as good as new is an ideal achieved only by using coils of "original-equipment quality"—the kind furnished by the builder of the motor—the kind with slot portions moulded to exact dimensions and with insulation not only adequate but sized for a perfect fit to minimize rubbing and wear.

330-15

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 68 New York, Saturday, October 16, 1926 *Number* 16

Results of Closer Co-operation in Association Work Are Apparent

SIGHT should not be lost of the fact that President Coates' address at Cleveland was an able presentation of the accomplishments of the year. It was not possible for him to be specific in every instance, but he did bring out forcefully the degree to which co-operation is being achieved in the industry. Progress along these lines has been due to the thorough co-operation of the executive committee, the Advisory Council, the managing director, the headquarters staff, under the guidance of Mr. Welsh; committee chairmen and committee members. The work was all well done. It is a continuing process, however, this co-operative effort, and it should not be permitted to lapse even for a moment.

At first there was a question in some quarters about the possible effect of the discontinuance of the mid-year meeting. Any doubts about the advisability of this action appear to have been dispelled by the accomplishments at the territorial meetings which displaced them. Moreover, the plan of having committee chairmen meet with the members of the executive committee appears to have been productive of good. It has helped to tie in the work to better advantage. Mr. Coates recommended that this plan be continued. That seems advisable. It makes for solidarity of effort.

These are just some of the things that the outgoing president mentioned. There were many more almost equally significant and indicative of progress. As Mr. Coates said, there is need for a closer tie-in between the sectional associations and the American Association. This process was advanced during the year and should be carried still further during the coming year. The sectional associations will gain by an extension of this plan and so will the industry as a whole. There may be some problems that are largely local, but, by and large, all problems are industry problems. As Mr. Coates pointed out, one of the most effective ways of tying in the sectional associations is to invite the president of each sectional association to meet with the executive committee whenever it is in session. This is an excellent plan. It makes for co-ordination of effort. And that is what is needed. Moreover, Mr. Coates had words of praise for the manufacturers. Their part in the recent accomplishments is not lightly to be dismissed. As he so aptly said, the industry is indebted to them for their studies and their development work.

As for the future, the recognition for which the industry has been striving will be found "with the manufacturers working to accomplish the results suggested and the operator studying the situation and carrying out his advanced ideas on the underlying principles of co-ordinated service and an adequate rate of return, and meeting the opposition to the electric railway squarely and fairly." These words are the words of Mr. Coates slightly paraphrased. It was courage that was needed in dealing with the situation in the last few years. And it was courage that was shown. Mr. Coates' review made that plain.

Penn-Ohio Company Finds the Way to Build Traffic Despite Obstacles

COURAGE to take the initiative—to make an aggressive fight for traffic along the very lines where its competitors had been most successful—gained for the Pennsylvania-Ohio Electric Company last year a large increase in its transportation business and the Coffin Prize for 1926. Post-war conditions in the territory served by this company were discouraging. Wages and other operating costs were high. The physical property was run down. Competitors had taken away a large volume of traffic. The company had its back against the wall.

But the management of the P-O system was not content to wage defensive warfare. Excuses and pleas for more liberal treatment were discarded as weak weapons. On the contrary, it was decided that the way to attain supremacy in the local transportation field was to furnish better transportation than did its competitors.

De luxe bus equipment was purchased on the theory that the best was none too good and the fare was made high enough to justify this kind of service. Following this, similarly attractive and comfortable electric railway cars were bought and put in operation. Lost traffic was regained from competitors and the positions of rail and bus service stabilized. This traffic fight was made on a quality rather than a price basis.

The company points to accomplishments under each of the six headings outlined by the Coffin Prize committee. It is significant that the progress made has followed closely in the wake of the improvement in equipment. Public relations have been improved with a resultant increase in earnings. Substantial economies have been effected in operation and maintenance. Construction practice has made steady advances. Accidents have been reduced in number, due in part to a vigorous safety campaign, but also in part to better rolling stock. Employee morale has improved coincident with the improvement in physical property. Financing has become easier as the position of the company has become more firmly established.

Many other noteworthy accomplishments mentioned in the brief presented by the Penn-Ohio Electric Company deserve the thoughtful attention of electric railway men. It is a record of all-around achievement of which the management may well be proud.

Give the Accountant a Chance

IN THESE days of rapidly changing conditions accountants have their problems, equal in importance to those confronting the engineering, mechanical, operating and other departments of the industry.

It is believed that the small number of accountants attending the annual convention is due in no small part to failure of executives and even the accountants themselves to appreciate the benefits to be derived from forming acquaintance and periodically renewing contact with other street railway accountants.

This interchange of ideas stimulates a similar degree of progress in accounting methods to that noticeable in other departments of the industry and has a very definite value in dollars and cents, especially since the income tax and the steadily increasing volume of reports have multiplied the demands upon accounting departments everywhere.

During the past year the officers of the Accountants' Association directed their efforts toward increasing the attendance of accountants at the Cleveland convention, believing that the central location of the meeting justified the hope of larger numbers, with more diversified and profitable discussions.

Letters were sent to executives of member companies urging active co-operation of accountants and others engaged in the accounting departments of such companies, in order that the industry as a whole might benefit from the studies that the association is making constantly through its committees and that individual interest might be stimulated in the progress others are making along the most progressive lines.

While the attendance of accountants at the Cleveland meeting was only normal, the sessions were among the most interesting and profitable in the history of the association. One of the outstanding features was the "get-together" luncheon held Wednesday noon at the Cleveland Athletic Club. Here the accountants apparently felt more free to present and discuss their individual problems than on the convention floor and there was greater opportunity for personal contact.

It is earnestly hoped that next year will see a much larger attendance and a greater number of round-table sessions. Every member company should have its accounting department fully represented, for no similar expenditure of time and money will produce more profitable returns.

Change of Convention Dates Would Aid Attendance of Accountants

REGARDING the date for the annual convention, members of the Accountants' Association attending the Cleveland meeting were particularly interested in some informal discussion. It was brought out that the peak of the accountant's work comes during the first week or ten days of each month. Thus, the present practice of holding the annual convention of the American Electric Railway and affiliated associations during the first week of October places an obstacle in the way of many accountants who would like to attend. Frequently they are prevented from so doing by the pressure of their regular work. To hold the convention a week earlier would be much better so far as the members of this association are concerned, but would be open to objection on the score of difficulty in getting hotel accommodations, October being a better month than September for securing favorable rates. The second or even the third week in October apparently would not be subject to this criticism and would suit the accountants far better than the present arrangement. Probably this change would not inconvenience others as much as it would accommodate the accountants. Advantages and disadvantages of such a plan merit the careful consideration of the association.

Claims Delegates Have Good Meeting

PERHAPS the most interesting feature of this year's Claims convention lay in the extent of the attendance. The opening meeting witnessed not only an unusually large gathering but it reflected to a remarkable degree the representation from all parts of the United States. From the Pacific Coast to the Atlantic, from North to South, had come the delegates. There were many familiar faces of those who have been regular attendants in the past and have been largely responsible for the keen interest of electric railway claims men in the activities of the Claims Association. And the old timers had the great pleasure of welcoming to the meetings much new blood. The newcomers were made to feel thoroughly at home and fell quite naturally into active participation in the convention program. With so favorable a setting and under the able leadership of President "Joe" Handlon, great profit to all resulted from the prepared addresses and from the discussions that followed the delivery of each formal paper.

Freedom of discussion was the rule throughout the meetings. Virtually no limit was placed upon this right of free speech "discussion," and therein lay much of the reason for the marked success attained by the Claims Association this year. Fresh inspiration, clear thought on problems offering difficulties in their solution, new friendships, the cementing of old and friendly ties, all these and much more were obtained by those claims delegates who attended the 45th annual convention.

Light Being Thrown on Bus Accident Liability

BUS operation by electric railway companies introduces as many new problems to the claims department as to any other branch of the railway company's activities. Up to the time that buses were actually operated in considerable numbers by electric railway companies, all sorts of theories were held as to their relative accident liability as compared with trolley cars. The experience of independent operators offered no definite answer to this question. Outside of a very few bus companies in the largest cities of the country, there were practically no bus operators who kept their accident records in the same detail as is customary on electric railway properties. It is only within the last year or so that electric railway companies have been able to compile very much in the way of data on the relative accident liability of these two forms of public carrier vehicles.

The best information yet available on this subject is undoubtedly contained in one of the papers at the Cleveland Claims meeting, as this paper treats the topic not only in detail but gives the experience on it of one of the largest bus operators as well as one of the largest trolley car operators in the country. While Mr. Drown's paper presents the results of only one full year's operation of buses by his company, during that time it had in service approximately 800 buses, mostly of modern type, so that the information given is a very valuable contribution to our knowledge of the subject.

Operators of buses in similar service, i.e., city and suburban, will do well to study Mr. Drown's figures and conclusions. They will not be repeated here except to say that liability of buses to cause accidents is probably higher than that of the electric car and that the need for good equipment maintenance is at least as great.

Lack of Interest Fatal to Committee Activities

OUTSIDE conditions may not be all that hamper the progress of the industry. Lack of interest may be a potent cause of some results that today come unsought. One instance that brings this home was the attempted meeting of the special taxation committee during the Cleveland convention.

Although the meeting was well advertised and considerable preparation was made to present the general subject of the gross-net tax with the hope of forming a nucleus for nation-wide action, not one member of the committee appeared! The committee had recently been augmented by one advisory member from each of the 48 states to further the work of tax standardization and possible reduction. Fortunately, twelve of these members were present and some valuable discussion ensued.

Without doubt there lies in this subject a tremendous opportunity for the reduction of costs, at least for many properties. There has been no voice raised against the plan proposed except that many difficulties are seen in the offing. If this be true, it is to be regretted that valuable time was lost at this annual congregation of railway men. Association work deserves better support than this, not because of the association, *per se*, but because the progress of the industry demands such action.

With a moment's reflection on what might be accomplished along the line of tax reduction, it is difficult to justify such complete lack of attention on the part of this committee.

Marked Progress Made in Accident Prevention Last Year

STATISTICS presented in the report of the joint committee on accident prevention show that continued improvement has been made throughout the year just ended. The figures are based on the records of 171 companies operating more than one-third of the total annual electric car mileage of the country. In the light of growing congestion and increased schedule speeds these figures testify forcefully to the effectiveness of the work being done by electric railways to increase the safety of street travel.

A decrease occurred in the total number of reported accidents and in nearly every individual classification of accidents. Although the number of motor vehicles on the streets increased considerably over the preceding year, the number of collisions between electric railway cars and automobiles was reduced. Collisions with vehicles other than automobiles, derailments, boarding and alighting accidents and the number of injuries to pedestrians were materially decreased. In these classifications the reduction ranged from 8 to 22 per cent.

The cost of accidents decreased slightly. In addition to the saving made by actual accident prevention, further economies thus resulted from safety work because the character of the accidents that occurred was less serious.

Co-operation with state, municipal and civic bodies in the work of accident prevention is one of the chief reasons for the improvement shown. The committee recommends that particular attention be paid to such activities in the future. Especially valuable is the educational work done by railway representatives in the schools. At the same time the education of transportation employees in accident prevention should continue without let-up. By following these principles, it is hoped that the record for the coming year may be better even than that for the year just ended.

Too Much Paper Used in Some Committee Reports

BULK rather than informative value was the most impressive feature of a number of the committee reports presented at the convention. Not because they contained too much information are these reports subject to criticism, but because the essential points which the committees wished to bring out were buried under a mass of material of doubtful value.

The purpose of such a report is to tell the association what has been accomplished by the committee during the year. Its value to the industry depends on the number of electric railway men who read it. This year a number of reports were extremely long, containing in at least one case more than 200 printed pages. Probably the number of railway men who will read in its entirety a 200-page report could be numbered on the fingers of one hand. A shorter report that received careful consideration from a large part of the industry would be of infinitely greater value.

Material that is already available in printed form elsewhere has no place in a committee report. Neither should information be included simply because it is more or less interesting. There should be some definite reason for putting it in the report. It should pertain directly to the particular subject under consideration. Inclusion of other material occasions not only a waste of money for printing, but also acts as a deterrent to reading the report. Findings of genuine value may go unnoticed because no one cares to wade through a multitude of pages to discover them.

Information that properly belongs in the report should be presented in the briefest possible manner consistent with clarity. When the matter intended for inclusion in the report is so presented electric railway men will not be able to offer the excuse that they "haven't time to read the reports of committees."

P-O Coach Terminals and Stations

Where coach and car meet at the outskirts of Cleveland

The heart of the bus system—P-O waiting room and station at Youngstown

Cleveland terminal

A wayside station

Newcastle terminal

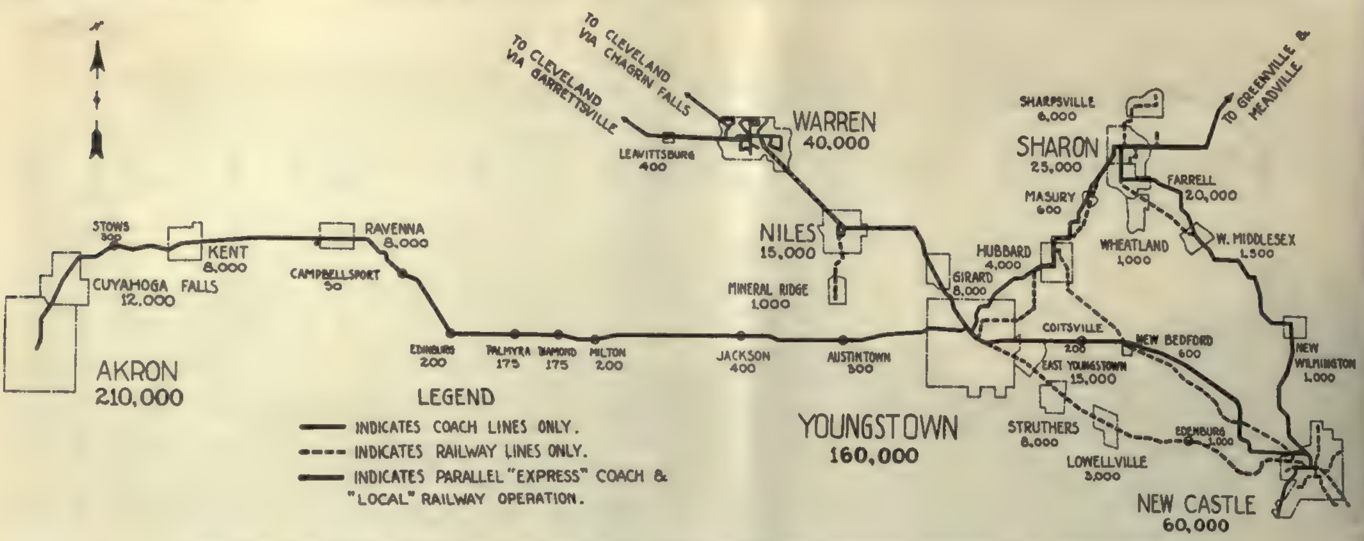
Demonstration of Transportation Progress Won Coffin Prize for 1926

Central Square, Youngstown, the Hub from Which Radiate the Electric Railway and Bus Lines of the Pennsylvania-Ohio System

Pennsylvania-Ohio Brief Tells How Improvement of Railway Rolling Stock and Track and the Establishment of Attractive Co-ordinated Bus Service Have Resulted in the Elimination of Jitney Competition and Have Placed Public Transportation on a Paying Basis Throughout the Territory Served —Modernization and Standardization of Equipment Have Paid Well

CONVERSION of deficits into net earnings on the transportation system operated by the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, has been brought about by the application of modern methods and equipment. Rehabilitation of the railway property and inauguration of bus operation made it possible to provide a service capable of competing successfully for traffic under present conditions. Concrete evidence of the company's intention to give thoroughly up-to-date transportation service and constantly to improve its facilities won the co-operation of the public with a resultant considerate attitude in franchise matters, assessments for bridges, etc. At the same time, jitney competition was eliminated throughout the territory served.

In pioneering with de luxe buses in an industrial territory the company avoided the temptation to hold bus fares below the cost of operation and definitely endeavored to give a type of service with buses different from that given by the railway. It established the precedent that the bus fare under such conditions should be higher than the rail rate. While building up its bus service the company has at the same time brought its rail lines up to a state of excellence which has permitted the proper field for each to be determined. Its experience shows that the bus may be used to attract new business to a transportation system as a whole, while improved cars and service are at the same time increasing the riding on the rail lines. It has demonstrated that when both bus and car services are intensively developed in comfort, speed and convenience, and when rates of fare are proportionate to the cost of operation, neither vehicle threatens to supplant the other, but both prosper together.



Rail, Bus and Combination Routes Operated by the Penn-Ohio Electric Company and Subsidiaries

Substantial economies have been made through the extension of one-man operation to all forms of interurban and city service operated by this company. Bus equipment has been standardized to reduce operating and maintenance costs. Attention to accident prevention has resulted in a decrease in accidents of 46 per cent in suburban territory and 34 per cent in the city of Youngstown. A policy of taking employees into the confidence of the management has brought about effective co-operation. These accomplishments are set forth in detail in the brief which the company presented in the Coffin Prize competition.

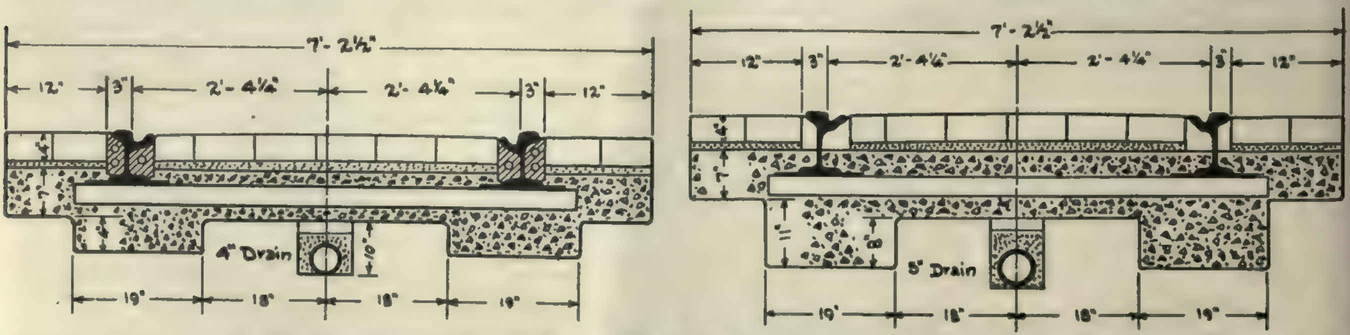
P-O System Combines City and Interurban Operation

OPERATIONS of this company cover three distinct fields of public transportation. The Youngstown Municipal Railway exemplifies co-ordinated bus and rail service in a city of 165,000 population. Examples of small city operation are found in Newcastle, Warren and Sharon, having populations of 60,000, 40,000 and 25,000 respectively. Three short interurban lines illustrate still another type of operation.

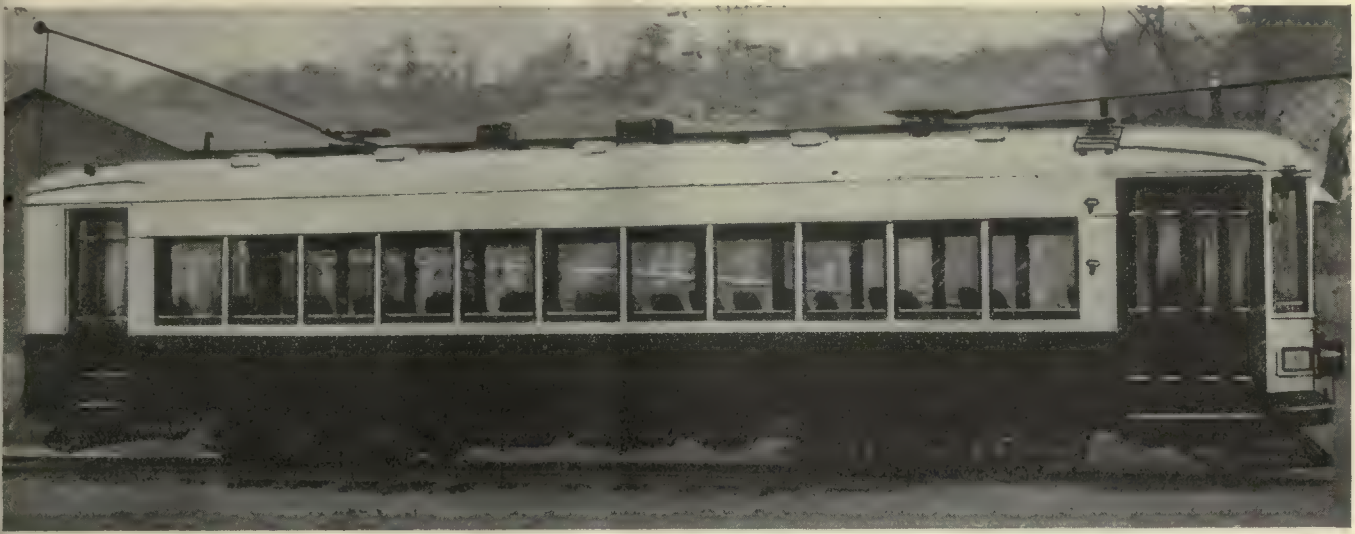
As a whole, the system comprises seven railway companies and two bus operating units. These are (1) the Youngstown Municipal Railway, operating in the city of Youngstown and suburbs under a service at cost agreement; (2) the Shenango Valley Traction Company, operating in Sharon and Farrell, with lines from these towns to Sharpsville, Wheatland and West Middlesex; (3) the Pennsylvania-Ohio Electric Company, the parent company, furnishing car and bus service in Newcastle; (4) the West End Traction Company, operating a 15-mile line between Youngstown and Warren via Girard and Niles, with shorter lines to Leavittsburg and Mineral Ridge, as well as local bus routes in Warren; (5) the East End Traction Company, running from Youngstown to the Pennsylvania state line, a distance of 5 miles; (6) the Newcastle and Lowell Railway, operating from the Pennsylvania-Ohio state line to Newcastle, a distance of 15 miles; (7) the Pennsylvania-Ohio Power & Light Company, operating a 15-mile railway between Youngstown and Sharon.

Bus service is provided by the Pennsylvania-Ohio Coach Lines, running express coaches at a higher fare to supplement the lower fare local rail service between Youngstown and Sharon. Similar service is given also between Youngstown and Newcastle, 21 miles; between Sharon and Newcastle, 24 miles; between Youngstown and Akron, 52 miles, and between Youngstown and Cleveland, 71 miles. The Pennsylvania-Ohio Tourist Lines run tourist coaches between Youngstown and Meadville, Pa., 54 miles.

Operations are divided into five groups, namely, the Youngstown Municipal district; the Newcastle district, comprising the Penn-Ohio Electric Company, the Newcastle and Lowell Railway and the East End Traction Lines; the Trumbull district, comprising the West End Traction Company and covering all rail operations in Niles, Girard and Warren, as well as the bus operation in the latter city; the Sharon district, comprising the lines of the Pennsylvania-Ohio Power & Light Company, the Shenango Valley Traction Company, the Sharon & Newcastle Street Railway, and an intercity



Reduced Weight of New Rolling Stock Permits Use of Lighter Track Construction. At Left Is Shown 103-Lb. Rail Surrounded by Elastite Filler. At Right Is Former Design Employing 134-Lb. Rail



Large Single Sash Plate Glass Windows 26 In. x 42½ In. Give Interurban Passengers an Unimpeded Outlook

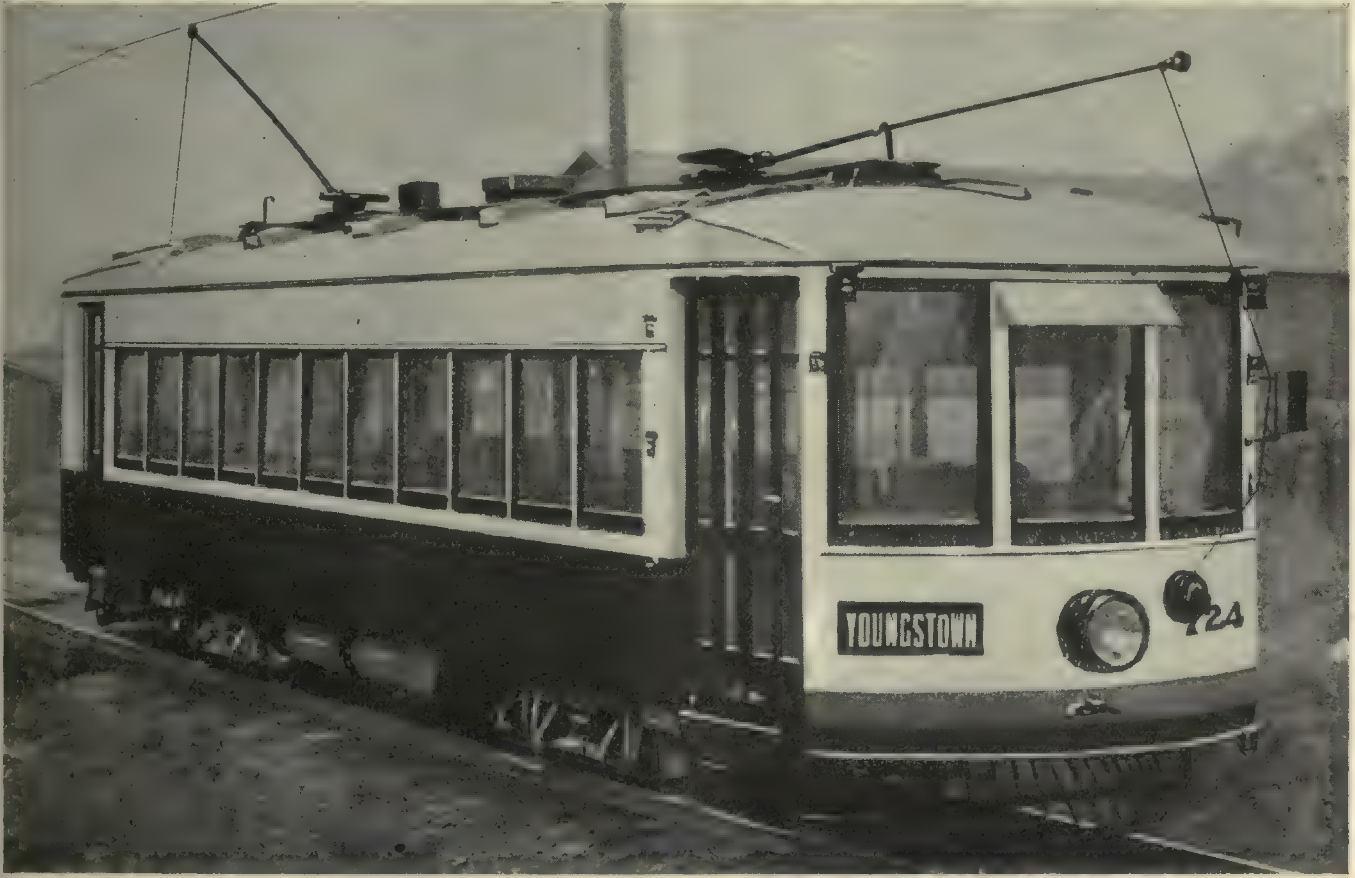
bus division comprising all bus and coach operations exclusive of those of the Youngstown Municipal Railway. The relation of the various rail and bus lines to each other is shown on an accompanying map.

Attractive Equipment Makes P-O Service Popular

FIRST among the achievements set forth in the brief is that of popularizing the service and gaining good will, or, in the words of the invitation sent out by the committee early in the year, "success in gaining public good will as indicated by the initiative, skill and enterprise manifested in popularizing electric railway service —more riders and more revenue."

Particular interest attaches to the experience of this company because the system has had to face the difficult problem of making mass transportation successful in cities where the average length of ride is 1.5 miles or less and also on short interurban railway lines where the right-of-way is inadequate to permit speeds higher than those of express buses.

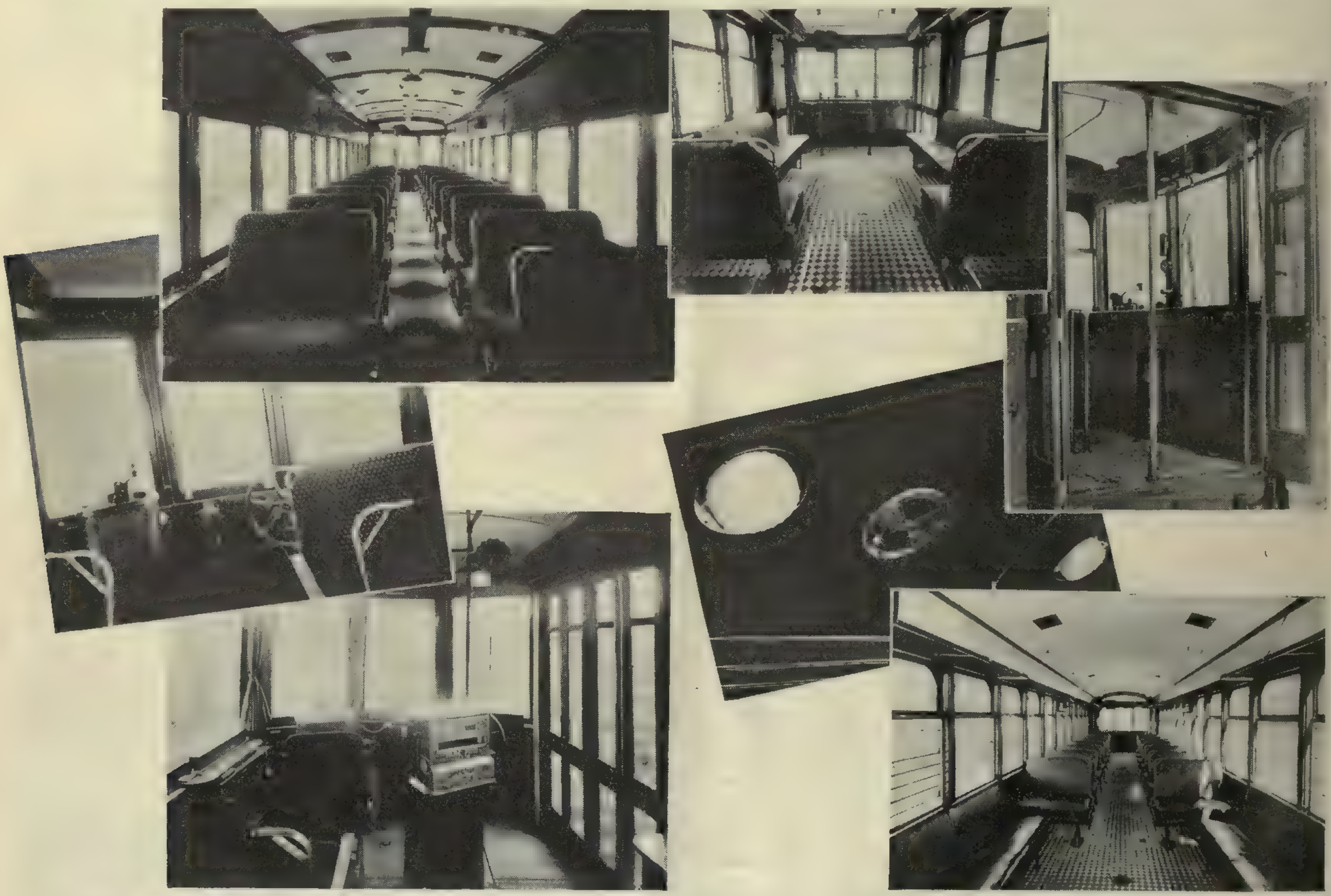
About 1920 the Penn-Ohio railway business was at its lowest ebb. Competition from jitneys and buses was at its height. Cars, tracks and other facilities of



New Cars Have Been Designed with a View to Attracting Riders. Sun Visor Over Vestibule Window Increases Safety the railway were none too good. The public relations that followed in the wake of such service were not what might be desired. As the result of these conditions the financial results of operation were unsatisfactory.

Facing this situation, the management decided that the first problem to be solved was that created by the independent bus operation between Youngstown and Warren and between Youngstown and Sharon. Careful investigation showed that the buses operating in competition with the company's service were faster and more comfortable than the railway's cars. As a result the company determined to meet this competition with bus service more comfortable and attractive than that afforded by its competitors.

When in fulfillment of this plan the Penn-Ohio Coach Lines Company was organized, in August, 1922, there was in the East no precedent by which to be guided. The slogan "the best is none too good" was adopted in designing the new equipment. Independent competition was rapidly conquered. Many operations not very solidly founded financially disappeared in a short time. All others have been purchased at reasonable figures. Despite the fact that coach fares were approximately 50 per cent higher than those of paralleling railway lines, the bus business increased rapidly.



Every Effort Has Been Made to Give an Attractive Appearance to the Interiors of the New Youngstown City Cars. All Rods, Pipes and Other Apparatus Are Hidden from View

Many people at that time prophesied the passing of the railway. The company, on the other hand, saw in this situation an opportunity to improve its service.

In September, 1923, therefore, the company purchased twelve interurban cars fitted up with the same degree of comfort as the motor coaches, but light in weight, operated by one man and carrying thoroughly modern equipment. In the following years additional cars of the same type were purchased and cars previously purchased were remodeled, so that at present all rail service is on a high plane. The public has a choice of express motor coach service at a higher fare or moderate priced rail service. The latter is growing in popularity.

Where there was a sound basis for bus operation because of a lack of rail facilities in some sections of the community the company has undertaken to provide service. Study has been made of the transportation situation throughout the company's territory and where service can be given better by bus than by railway the company has not hesitated to make the substitution. Every section of every community in which the company operates is now reached either by rail lines or by bus.

To bring the Penn-Ohio service up to the desired level of excellence old transportation vehicles have been scrapped and new vehicles acquired. On the railway lines outside of Youngstown, out of a total of 83 cars now in use only seven were in service prior to March 1, 1918. These are used only for tripper or extra service and have been entirely rebuilt for one-man operation. On the Youngstown Municipal Railway the average age of cars is less than seven years. Only the highest standards of maintenance, painting and cleanliness are tolerated. No stone has been left unturned to make the rolling stock attractive.

The appearance of the operating personnel is in conformity with the attractive appearance of the equipment. The old blue serge uniform has disappeared on the Penn-Ohio system. Every operator, inspector and supervisory official is arrayed in a whipcord uniform.

Because the company is proud of its property and service an emblem has been designed to mark and distinguish it. Actually the emblems used are four in number—one for the Penn-Ohio system, including railways outside of Youngstown; a second for the P-O Coach Lines; another for the P-O Tourist Lines, and a fourth for the Youngstown Municipal Railway. The emblem is used on the cars, on schedules and other printed matter, on caps of all employees, as zone markers on rural routes, on stations, car and bus stops in the cities and is emblazoned in electric signs on company offices and waiting rooms. No other trademark in the district has been so effectively distributed as that of the Pennsylvania-Ohio Electric Company.

Genuine service is given to the public and newspapers by the department of public relations. When a director of public relations was appointed in 1914, the desirability of dealing intimately and frankly with the public, newspapers and employees was not so widely recognized in the electric railway industry as it is now. The guiding principles of the department's twelve years of work are simple. They are to give the fullest information possible regarding the company's affairs, its plans and its purposes, to supply promptly to all newspapers information regarding accidents, interruptions to service and emergency changes in operation, to give equal, ready service to all newspapers regardless of politics, corporation bias or other considerations. The fruitfulness of this policy is evidenced by the fact that letters of commendation have been received from the publisher or editor of every daily newspaper in the cities in which local transportation service is furnished by the company. A typical letter is reproduced on another page.

Public relations work is carried on throughout the entire organization. Employees are members of every civic organization of standing throughout the territory and are active in every civic movement. Executives and other company representatives are frequent speakers at public functions, either in behalf of state public information committees or their own company.

Co-operation is given by the company to many other organizations. For example, the newest and largest garage on the property was placed at the disposal of the Youngstown Automobile Association for its 1925 show.

Advertising done by the company is designed to place before the public full information concerning the service, especially to advise the public in advance of changes in operation or equipment. Aside from such service advertisements, the company has a wide variety of publicity dealing directly with the sale of rides. Paid space in the newspapers, window posters and cards in the cars, calendars in offices, post cards in homes, blotters in hotels, timetables in card and folder form and similar widely distributed reminders are mediums used to push both passenger and freight business.

At hotels and theater box offices attractive framed schedule cards are prominently placed. Outdoors are scores of painted billboards to invite people to travel by coach. Neither a visitor in this territory nor a local resident can pass a day without being faced by some form of Pennsylvania-Ohio publicity.

Indicative of the results of these merchandising efforts is the fact that within the last eight years the company has obtained fourteen new franchises and numerous fare increases depending largely on local consent. When the Youngstown Municipal Railway was formed in 1818 a separate organization was set up because it was deemed necessary to have entirely separate administration and accounting due to the service-at-cost agreement. Late in 1925, however, the management concluded that a merged organization would be more efficient and economical. Despite the fact that there is room for difference of opinion in the allocation of expenses, the city of Youngstown, through its Commissioner of Street Railways, has approved this consolidation. Such willingness to co-operate toward more economical operation may be regarded as strong proof that the city has faith in the railway management.

Communities have shown a considerate attitude in assessments for bridges, viaducts, etc. As the territory is much broken by hills and water courses, relief from paving expense is often secondary to relief from bridge and viaduct costs. Each improvement is a matter of negotiation, but the actual allocation of expense for past work is evidence of the reasonable attitude of the public officials.

Standard C.E.R.A. Freight Car Designed for Use on Connecting Electric Lines. Ten Cars of This Type Were Recently Bought by the P-O Company to Handle Its Growing Freight Business

Loading Tank Truck at Central Garage. Below, Delivering Gasoline at Outlying Stations

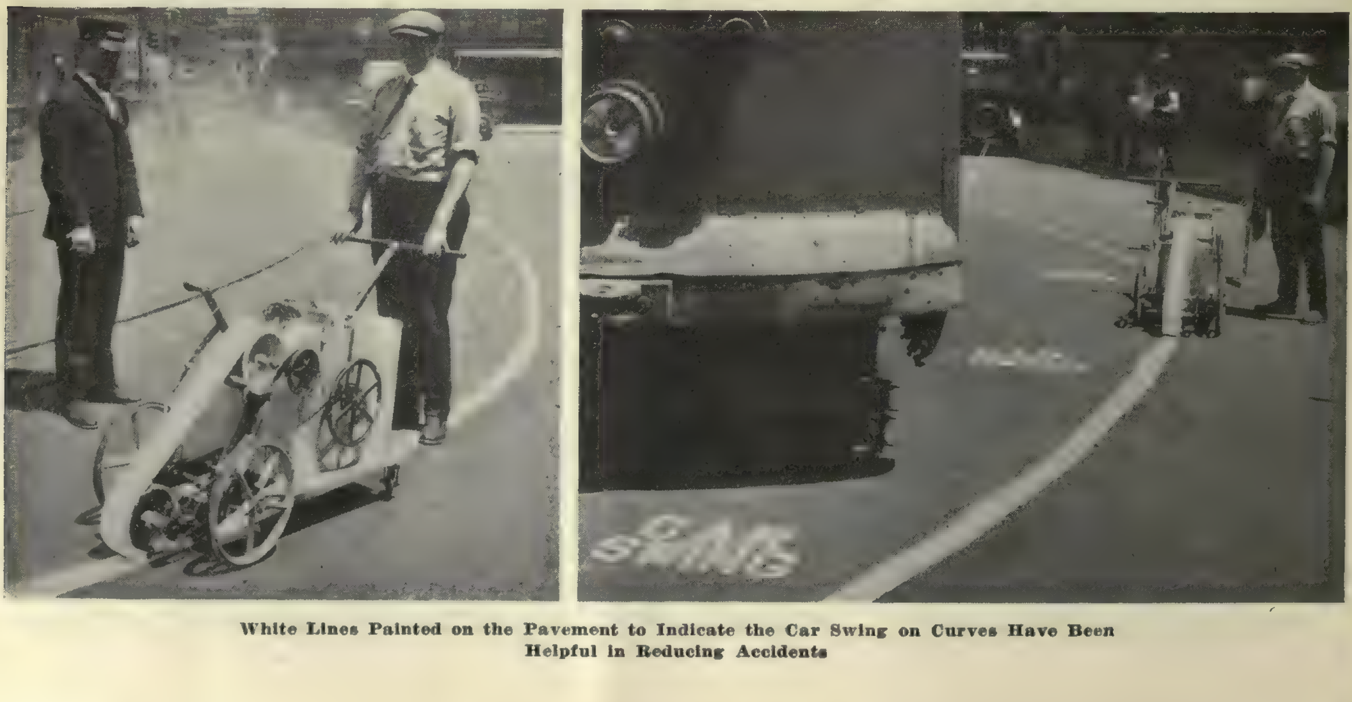
Of even greater importance has been the elimination of competition. In all the territory served by the Pennsylvania-Ohio system the jitney is dead. This has come about through the appreciation on the part of the public that reliable co-ordinated railway and bus operation is preferable to haphazard service from ever-changing operators. Local ouster legislation was passed wherever required to accomplish this end.

Financial results have been most encouraging. Since the present policies were inaugurated in 1922, the growth of the gross and net earnings has been uninterrupted. Last year, 11,000,000 more revenue passengers were carried than in 1921. Figures for the individual years are given in the following table:

FIVE-YEAR RECORD OF P-O SYSTEM

Year	Gross Earnings	Revenue Passengers
1921	$3,049,269	32,236,873
1922	3,092,014	38,147,270
1923	3,352,312	43,656,226
1924	3,794,510	42,047,120
1925	3,943,324	43,333,133

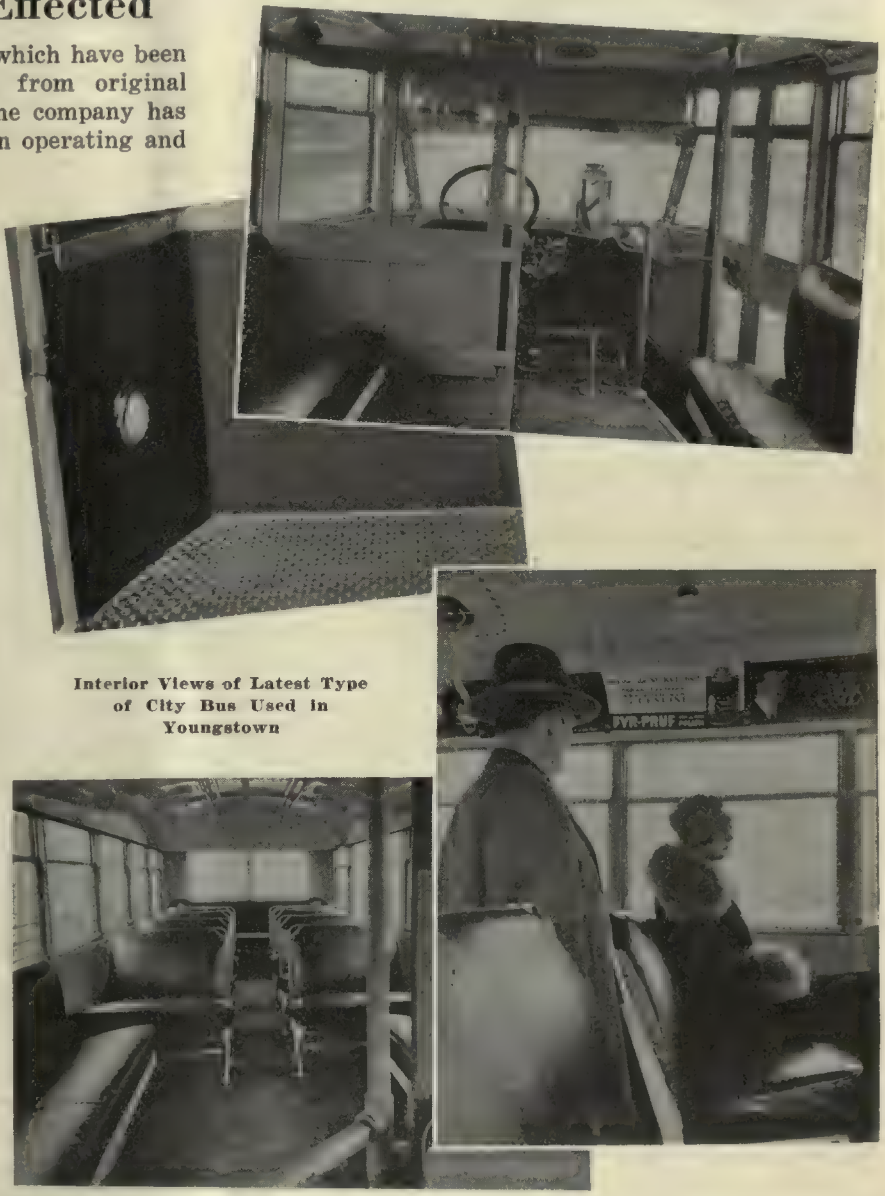
A rapidly growing freight business has been another source of revenue to the company. In 1919 joint tariffs became effective from the Penn-Ohio lines to many points in Ohio, Indiana, Michigan and Pennsylvania. Delivery is made in from one to three nights via the electric lines as compared with steam railroad deliveries varying between three nights and three weeks. This freight service has grown so rapidly that it has already become necessary to plan a Youngstown terminal and warehouse larger than the one built in November, 1924, covering almost an entire city block. Ten new C.E.R.A. standard freight cars were ordered in 1925. Special



White Lines Painted on the Pavement to Indicate the Car Swing on Curves Have Been Helpful in Reducing Accidents pains have been taken in preparing and distributing a "Shippers' Handy Tariff Guide." This is a looseleaf publication with a complete index of the freight stations reached, a map of the line and the classification of commodities and rates.

Substantial Savings Effected

UNDER the heading of "Economies which have been introduced in operation resulting from original ideas as well as the extent to which the company has taken advantage of new developments in operating and maintenance practice and equipment originating with others," the brief submitted by the Pennsylvania-Ohio Electric Company presents an imposing list of accomplishments. The sound merchandising policies which have resulted in more revenue have also made possible material economies. These savings result from the fact that all cars, buses and coaches are one-man operated and that the new cars due to their lighter weight and modern equipment require less power and less maintenance.



Interior Views of Latest Type of City Bus Used in Youngstown

One-man operation is now 100 per cent complete on the Pennsylvania-Ohio system. The chronology of the change was as follows:

1919—One-man operation begun in Newcastle city.

1920—Change-over completed in Newcastle and Sharon.

1923—One-man interurban operation begun except on Girard line.

1924—Change-over of interurban operation completed.

1925—One-man operation everywhere except Youngstown.

1926—100 per cent one-man operation including Youngstown.

On the railway lines outside of Youngstown the effect of one-man operation has been to reduce the number of trainmen from 228 in 1920 to 159 in 1925. Man-hours were reduced from 818,502 to 474,646. Total wages fell from $578,052 to $294,168, while the average yearly wage per trainman increased from $1,596 in 1924 to $1,850 in 1925. All changes were made in the course of the normal turnover of platform men except that some men on the Trumbull division were furloughed without loss of seniority or wage rights. Most of them returned again in a few months.

Complete modernization has reduced operating expense per car-mile from 35.6 cents in 1924 to 32.5 cents in 1925. Energy consumption on the new interurban cars in 1925 was 2.76 kw.-hr., a saving of 28 per cent. Upkeep is 51 per cent less and platform wages 15 per cent less, despite the higher wages per man. Comparison of costs for 1922 and 1925 shows a saving of $30,000 in equipment, power and platform labor. On the first five of these cars to be placed in operation the rate of return on the investment was approximately 41 per cent.

Further economies have resulted from the building of a garage with labor-saving machinery for storing and maintaining buses and coaches, from the handling of gasoline in carload quantities, and from the adoption of pyroxyline lacquer for refinishing cars and coaches.

Standardization of bus and coach equipment has resulted in material savings. Revenue and cost figures for various years are given in the following table:

BUS OPERATING DATA—CENTS PER BUS-MILE

Type Service		1922	1923	1924	1925
City	Costs	20.60	24.60	30.20	30.10
	Revenue	25.20	24 90	29.40	29.39
Interurban	Costs	.....	.....	28.22	23.75
	Revenue	.....	.....	30.45	25.15
Tourist Lines	Costs	.....	.....	.....	15.30
	Revenue	.....	.....	.....	14.25

The foregoing table covering operations from September, 1922, to Dec. 31, 1925, shows that the true cost of service per bus-mile in city service was approximately 30 cents after the newness had worn off. In 1924, this figure was 30.2 cents and in 1925, 30.1 cents.

Since Jan. 1, 1926, motor-bus costs have been in accordance with the classification recommended in 1925 by the American Electric Railway Association. Figures

Time Clock Used to Check Regularity of Bus Operation in Youngstown

in cents per bus-mile for the first five months of 1926 follow:

January	29.83
February	31.23
March	30.26
April	27.31
May	29.04

As this period included severe winter operation and did not benefit from new and greater capacity equipment at the start, it is expected that the cost for this year will be 1 cent to 2 cents under 1925.

Improvements in Construction

"IMPROVEMENTS in construction which have resulted in reduced first cost and greater reliability of service" have been numerous on the Penn-Ohio System. Original features incorporated in the design of new cars have had an important bearing in reducing costs as well as increasing the attractiveness of the vehicles.

On the new interurban cars every seat is deep cushioned and upholstered in plush. The floor is covered with battleship linoleum easily cleaned, easy to walk on and durable. Not a pipe, bar, rod or cord obstructs the view or irks the eye. The rodless, cordless Ohmer register and table were specially devised for this operation with one man per car and nine fare classifications. On these cars the switches are inclosed in cabinets, as are also the engineer's valve and controller. The rear platform has been left as a spacious lobby. Inclosure of the equipment gives a better appearance and avoids interference by the passengers. Mahogany is used to conform to the general interior trimming.

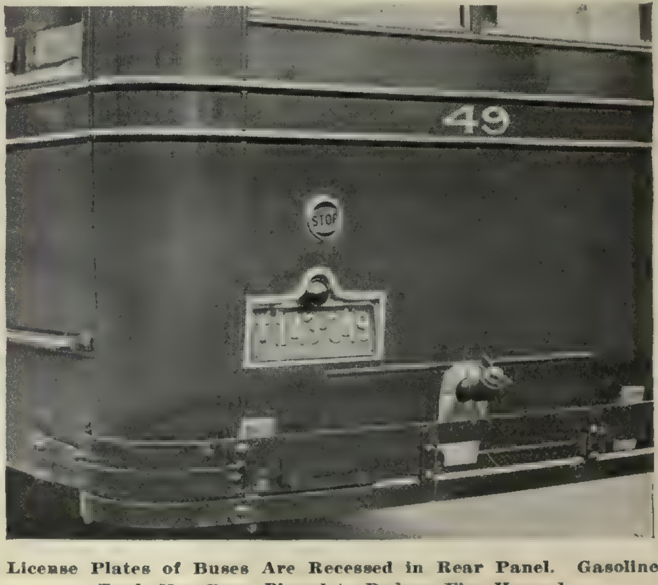
Diffused lighting fixtures give pleasant and effective illumination. Both front and rear vestibules have extra large sash to give the passengers a better view. Pneumatic control permits remote operation of the rear door. A mirror in the operator's vestibule gives a clear view to the rear.

Up-to-date features have been included also on the latest Youngstown city cars. There is a similarly complete absence of cords, rods, bars, piping or exposed apparatus. Rubber flooring is an advance on battleship linoleum in durability, appearance and ease of cleaning. The floor over the motors has a recessed manhole cover which is less conspicuous than a ring. Plate glass sash is framed in narrow fittings to improve the passengers' vision. A new system of lighting with twenty opalescent domes per car was evolved by the company's engineers.

Selective pneumatic control of wide double doors in front as well as at the rear makes it possible for one man to handle the large 64 seat industrial trippers which are used. Additional safety features have been installed on Birney cars purchased several years ago. Peacock hand brakes have been added for emergency use. Box jaws instead of clevices have been installed for the brake rigging to avoid disablement in case a bolt falls out. Steel wheels have replaced the cast iron wheels formerly used. Two home-designed mechanical sanders have been added to supplement the air sander —a special precaution taken because of the heavy grades. Plate glass has been used in the car windows because it is both safer and more attractive than ordinary window glass.

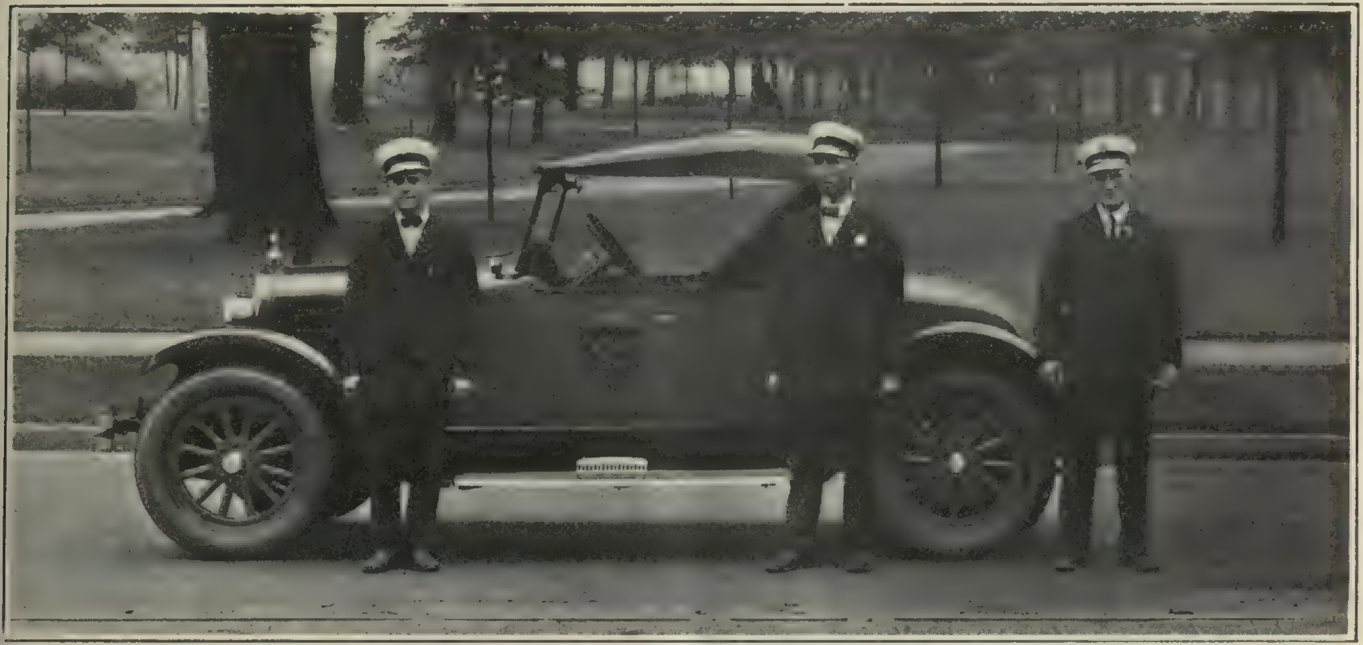
Improvements have been made also in the bus equipment operated. Special features on the new city buses include deeper chassis frame, new radiator suspension, engine with new manifold and heating attachment, chassis with new type rear axles with air brakes, and dual rear tires 34 in. x 7 in. instead of 36 in. x 6 in. for easier riding. A wireglass panel behind the operator saves him from annoyance by passengers. Longitudinal seats at front give passengers easier ingress and egress. Rubber flooring, modern lighting fixtures and ceiling ventilators are used. Wide, deep steel steps with safety tread and step light add to safety. A standing passenger has outside view. Narrow aluminum frame sash gives maximum glass area for vision of seated patron. The rear end has a single recessed panel for stop light, tail light and license plate. The fuel tank is now installed at the rear instead of the side because in this position it is more likely to stay level, to cause less slopping of gasoline and to reduce fire hazard.

On the latest interurban coaches the seating capacity has been increased from 18 to 25 and the length increased from 27 ft. 6 in. to 28 ft. 7 in. The first coach cost $7,000; latest type, $9,000. A change in seating arrangement has eliminated middle doors. Lighting improvements have been worked out by Penn-Ohio engineers in co-operation with Ivanhoe-Regent plant of General Electric Company. Lamps of 21 cp. in Miller opalescent domes are used. Seats are double, except a five-passenger seat at rear under which the baggage



License Plates of Buses Are Recessed in Rear Panel. Gasoline Tank Has Been Placed to Reduce Fire Hazard compartment is located. The cross seats are 32 in. back to back. All seats are upholstered in grained leather and equipped with air cushions. The driver's seat is also equipped with an air cushion and is at a more comfortable height than in earlier types. The battery is now accessible from inside instead of outside of the coach. A safety light has been added at the entrance step. The cowl has a greater flare because the width has been increased from 7 ft. to 7 ft. 8 in. The windshield is now one piece, narrow vertical louvers at the side serving for ventilation. On the windshield is a spotlight operated from inside the coach. The visor is of metal instead of leather. The sign box is integral with the visor under the roof extension. The destination sign is operated from the inside.

A worthy building has been constructed to house this automotive equipment. The new Youngstown garage, opened early in 1926, has a frontage of 116 ft. and a depth of 262 ft. with a rear extension running 172 ft. along a private court. Underground storage tanks are provided having a capacity of 100,000 gal. of gasoline and 20,000 gal. of oil. Their large capacity permits the company to enjoy tank car prices, sometimes 7 cents under the retail and 4 cents under the tank-wagon price in the same territory. The temperature of the brick and concrete oil chamber is maintained in winter at a minimum of 60 deg. F. for easy handling and efficient use. Electric centrifugal pumps deliver both gasoline and oil to the service station at the rear of the storage and inspection area.



One of the Service Automobiles Used by Inspectors Supervising Intercity Coach Operation

Economies have been accomplished in the purchase and delivery of fuel. Tank cars deliver gasoline and oil directly to the underground tanks at the rear of the garage. A tank truck of original design is used to distribute gasoline and oil to outside garages and service stations. It has two 250-gal. gasoline compartments and one 350-gal. oil compartment. The chamber at the back is used for hose connections and miscellaneous gear.

Vehicles enter the garage via a rear court and leave via electro-pneumatically operated doors on the side. The total area is 40,700 sq.ft., of which 30,000 sq.ft. is for storage and inspection. Lamps of 200 watt capacity with enameled steel dome reflectors give 5 ft. candles intensity of illumination at the floor level. The Curtis "Air Mist" system cleanses vehicles quickly and effectively. Two "service station" pits are equipped for high pressure oiling and greasing.

During 1925, after two years of tests with a dozen kinds of lacquer, 40 per cent of the cars and 70 per cent of the buses were lacquered in accord with the chrome orange color scheme standard for Youngstown equipment. Lacquering has cut the shop time for two men from six days of the paint-varnish-enamel era to two days. The saving in cost of material is about 40 per cent. Because of the smoke and sulphur laden air of Youngstown vehicles are relacquered once a year. As this can be carried out within eight hours, a car can be put through practically between the peaks of the same day. Lacquering can be done in the open in bright sunshine. Aluminum panels have been found superior to steel for bus upkeep.

During 1925 the company completed the installation of automatic reclosing circuit breakers to tie together sections of the railway feeder distribution system. In this way loads have been balanced to better advantage and the installation of additional copper has been avoided.

For use in the Trumbull, Sharon and New Castle districts, three line trucks were bought during 1925 to replace line cars. Aside from their greater flexibility, line trucks are cheaper to run because one driver takes the place of two trainmen. The New Castle interurban, which has much right-of-way distant from the highway, is the only division now left with a line car. The widest efficient use is made of automotive service equipment, whether in the transportation or engineering department. The automotive fleet includes trucks for slag, paving, cement, ties, rail, etc.; also welding trucks in place of welding trailers.

Modern light-weight cars permit savings in track construction. A 134-lb. Trilby section was used in Youngstown track rebuilt in 1916. This track was thermit-welded and laid on International steel twin ties spaced 6-ft. centers and laid in 7-in. concrete with 11 in. under the ties.

With the general adoption of light-weight cars it became possible to continue this long life construction, using only a 103-lb. section with but 4-in. concrete under the steel ties. The 1916 type of construction would cost today $68,600 per single track mile. The present type cost $55,400 per single track mile—a saving of $13,200 due to the use of lighter cars, although the new track has the additional cost of "Elastite" as a sound deadener. An index to the permanence of the track and its smooth riding qualities is afforded by the fact that during 1925 there were only seven breaks in 1,800 thermit welds.

Substantial Reduction in the Number of Accidents

"Particular success in conducting a safety program and actually reducing the number and seriousness of accidents" has been attained by the Pennsylvania-Ohio Electric Company. Every passenger car in operation on the system is equipped completely with standard safety devices. Part of the credit for the reduction of accidents can be attributed to this fact and part to the closer inspection and better training of operators.

Snappy Whipcord Uniforms Worn by Transportation Employees of the Penn-Ohio Company

This management has engaged in safety work of an intensive character since 1920. The safety organization consists of a central safety committee, with representatives from every department, under the chairmanship of the general manager, together with intermediate safety committees within each department. All safety work is done through such committees in close co-operation with specialists of the Bureau of Safety of Chicago.

Practical suggestions for greater safety are solicited from all sources. In 1925 such suggestions numbered 215. In addition to its internal safety work, the company, as such, and its employees take an active part in all public safety organizations and movements, its general manager being president of the Youngstown branch of the National Safety Council.

Through improvement in equipment and plans for consistently maintaining the enthusiasm of the personnel, accidents per 100,000 car-miles on lines outside Youngstown declined from 36.6 in 1920 to 23.6 in 1924 and 22.6 in 1925. Accidents of all kinds, whether due to company or outside causes, declined from 1,768 in 1920 to 953 in 1924 and 887 in 1925.

There were fewer accidents with 100 per cent one-man operation in 1925 than with the two-man operation in 1920. Account 92, "Injuries and Damages," declined from 12.57 per cent of gross in 1920 to 7.62 per cent in 1924 and then to 3.54 per cent in 1925.

In Youngstown the use of modern cars having uniform equipment has been an important factor in accident prevention. Beginning in 1925, the original green body color of the cars was changed to chrome orange for greater conspicuousness in a hazy atmosphere. Cars are made still more visible by painting the bumper white. Equipment of all cars with air operated Folberth sash cleaners or squeegees gives the operator a clear view automatically.

In December, 1922, the Youngstown Municipal Railway began to segregate "chargeable" accidents. Accidents were cut from 682 in 1923 to 452 in 1925, or 34 per cent. At the same time, accidents beyond the company's control decreased only from 1,541 in 1923 to 1,516 in 1925.

ACCIDENT REDUCTION RECORD
YOUNGSTOWN MUNICIPAL RAILWAY

Accidents	1923	1924	1925
Reported	2,223	2,017	1,968
Chargeable to railway	682	497	452
Per 1,000 car miles	0.54	0.50	0.49
Per 100,000 passengers	8.68	8.12	8.11

The city of Youngstown and the company shared in the purchase of a $350 machine which is used to paint "car swing," "safety zone" and other markings on street paving. The painting is done by city workers, with a railway representative on hand, when necessary. While the work is being done, space is kept clear by means of red flags.

Red Cross first aid instructions have been added to the other safety work. In all 642 employees have received instruction. While this work has been carried on only since the early part of 1926 there have been at least two cases where the knowledge of first aid on the part of the employee has resulted in the saving of life.

Safety meetings are held in the schools and for the public. In 1925 as many as 1,200 persons attended such a rally at Warren, which was held directly under the auspices of the safety organization of the company. This meeting resulted in the organization of a community safety council.

Accident prevention contests were started in December, 1922. The car men were divided into four groups, and at a later date the bus men were similarly divided. The winning team each month is entertained at a dinner to which prominent citizens or noted workers in accident prevention are guests and speakers. The claim department acts as umpire in passing on all accident reports by team members and only those accidents which could have been prevented through the vigilance of the car or bus men involved, are charged to their respective teams. The first full year of the competition, 1923, the average monthly total of accidents charged to the car men's teams was 57. In 1924 the number was reduced to 41 and in 1925 was further reduced to 37.

A bonus system rewarding car men and bus men as individuals has been in effect since Jan. 1, 1924. One dollar is paid for the first month without an accident, two dollars for the second successive month and $3 for each successive subsequent month without an accident. During 1925, the car men earned $4,423 and the bus men $1,191 in accident prevention bonuses.

The three operating divisions outside of Youngstown also participate in safety contests. On each division, both the trainmen and bus drivers are included in the teams. However, on account of the fact that the divisions vary considerably in car mileage operated, the contest is waged, not on the basis of the number of accidents, but upon the mileage operated per accident.

The first contest of this year, ended Feb. 28, 1926, was won by the Newcastle division with a record of 14,394 miles per chargeable accident. The second contest was won by the Sharon division with a record of 39,456 miles per chargeable accident. The third contest was won by the Sharon division with a record of 44,469 miles per chargeable accident.

Excellent Relations Enjoyed with Employees

OUTSTANDING accomplishments in the development of good relations between management and employees are claimed for the Pennsylvania-Ohio Electric Company in the brief. All the trolley and city bus operators of this property are members of the Amalgamated Association. Although operating in a highly industrialized area, subject to changes in the demand for high wage workers, this management has a record of twenty years of harmony with its employees, all negotiations being conducted directly between the management and committees of employees.

Facts are given to the men on company finance, on the local wage and business situation, on the cost-of-living indices, etc., so that the men negotiate upon the same economic basis as the management. One proof of the reasonable attitude of the trainmen is that they relinquished the "two-men-per-vehicle" clause when shown that one-man operation was economically necessary. They have co-operated willingly in the use of power-checking watt-hour meters and have approved special awards for freedom from accidents.

One aid to the amicable settlement of all questions between management and men has been an unbroken agreement for the past six years that no statement regarding matters under discussion will be given to the press by either company officials or men until negotiations are ended or suspended. This has been an excellent preventive of public agitations and publicity, particularly concerning wage matters.

Trainmen no longer wear conspicuous badge numbers on their caps. The small numerals are on the back of the badge, unseen by the public. This step toward humanizing the platform job was made for the reason that complaints had diminished to the point where such iden-

Typical Examples of Commendatory Letters Received by the P-O Management

Erie Railroad Company

MEADVILLE, PA., Nov. 20, 1925.

PENNA. & OHIO ELECTRIC COMPANY,
Youngstown, Ohio.

Gentlemen:

A case has just come to my attention where your motorman, Mr. F. A. Blott, running between Warren and Leavittsburg, noted brake sticking and fire flying on our second 88 Engine 4126. Upon arrival at Leavittsburg he advised our operator, and arrangements were made to stop the train and get the brakes released. His prompt action may have prevented serious trouble, and I feel that his action is highly commendatory.

I would be pleased if you would advise him of our appreciation of this service and in case you can consistently do so, if you would make proper record thereof on his service papers.

Yours very truly,
A. L. KLINE,
Superintendent.

The Youngstown Telegram

YOUNGSTOWN, OHIO, July 28, 1925.

MR. C. S. MACCALLA,
Vice-President & General Manager,
The Pennsylvania-Ohio Electric Co.,
Youngstown, Ohio.

Dear Mr. MacCalla:

For several weeks I have been planning to write you to compliment your company on its policy of free and frank discussion with newspaper men of all subjects pertaining to the welfare of citizens in general.

Always a believer in free discussion of all subjects, I feel sure that this attitude on your part has done much to improve the relations between your company and the general public.

In this connection it would be only fair for me to add that information coming to us through your publicity department has not only been fair but thoroughly reliable.

Very truly yours,
W. L. STURDEVANT,
Editor *The Youngstown Telegram.*

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51 Willis Avenue,
Youngstown, Ohio.

MR. R. N. GRAHAM,
Mgr. P. & O. Electric Co.

Dear Sir:

Wish to extend my deep appreciation in recovering diamond lost from my ring on Hillman bus No. 32 last Thursday night due entirely to alertness and willingness of one of your inspectors by name of James Fire, who followed and reached bus before it left termination, took friend and myself with him and found diamond.

Surely having such efficient employees is a fine recommendation for your company.

Very truly yours,
MRS. S. MCLAUGHLIN.

MR. JOHN HARVEY,
Youngstown Municipal Railway,
City.

Dear Sir:

Last evening I boarded a Mahoning Avenue car in charge of operator No. 348 and while a passenger on this car I had the pleasure of witnessing an act of courtesy which was indeed worthy of commendation. I assure you that this deed did not pass unnoticed by any of the passengers on this car.

When approaching Deed Street this operator received a signal from an old man who wished to board this car. Operator No. 348 stopped his car and alighted to assist this old man in every possible manner. He escorted him into the car and saw that he was seated before he returned to the front of the car.

The old gentleman left the car at Hazel Street and again this operator left the front of the car and went back to where he was seated and assisted him to the front of the car. The operator then left his car and lifted this old gentlemen from same to the street and escorted him through the traffic and did not return to his car until the old gentleman was safely on the sidewalk.

Trusting that I may have the pleasure of again riding behind operators of this kind, I beg to remain,

Very truly yours,
S. J. HOLT,
1651 Wellington Avenue.

tification was no longer needed. On the other hand, the name of the operator appears in his vehicle.

Early in 1926 the company took another step forward in raising the morale of all its bus and car men by presenting the newly adopted whipcord uniform to every operator, inspector and supervisor. Forty-two trainmen had paid for such uniforms, after seeing a sample, before they knew they would be reimbursed. Furthermore, a $1,000 life insurance policy was issued free and without physical examination to every employee.

The good teamwork between the company and the men is well exemplified by the fact that there exists among the company's men one full military band, three orchestras, basketball, bowling and baseball teams. Sixteen per cent of the trainmen belong to the Twenty-Year Club founded in 1925.

Noteworthy Accomplishment in Financing

THE securities of the company cover its combined light and transportation properties. Since 1917 the company has been selling its securities on the customer-ownership basis to the public through its employees and to the employees themselves, each offering resulting in a substantial over-sale. At least 75 per cent of railway employees are stockholders in the company.

The localities embraced by the Penn-Ohio System being essentially industrial, the principal product being steel and steel products, it is only natural that the public has been educated over a period of years in trading in local industrial securities, the public utilities having been considered a relatively unimportant factor. During the past year, however, the securities of the company have been established as one of the most reliable investments. Through the agencies of the securities department, 24,593 shares of $100 par value have been sold through 7,398 transactions to 2,695 customers and 1,035 employees.

A bulletin, the P-O Investors' News, issued monthly to stockholders, acquaints them with interesting and intimate affairs of the company, emphasizing its activities and relations to civic development, new business items stressing the part played as a public service organization in industrial achievements and presenting articles dealing with the affairs of the light and power industry. This bulletin is the medium for offering the industry's news on political questions and for spreading information rather than serving as an advertising medium.

The experience of employees gained in stock selling campaigns proved valuable in 1924 when it was necessary to purchase easements for a 132,000-volt transmission line between Toronto, Ohio and Youngstown. To avoid excessive prices, plans were made for a surprise attack *en masse*. First an airplane map of the entire district was made. On this every piece of property involved was plotted in relation to the course of the right-of-way. These maps were suitably subdivided for the instruction of, and use by, the squads assigned to each portion of the route. Each captain and his men knew exactly what they were to do at the zero hour when the drive for options was started simultaneously over the entire 40 miles. So effective was this mass attack that 93 per cent of the easements were obtained in two days with no further work than the cash closing by the right-of-way department. Among the participants in this drive were the manager of railways, three railway superintendents, a machine shop foreman and almost a score of railway inspectors and platform men—all of whom were chosen because stock-selling campaigns had developed the fact that they were salesmen.

SUCCESS HAS REWARDED COMPANY'S EFFORTS

Adoption and consistent carrying forward of a progressive policy of efficient service and selling that service to the people is thus the basis of the claims made by the Pennsylvania-Ohio Electric Company in its brief. This policy has recognized the fact that the private automobile is the real competitor of public transportation companies and that public transportation must be conducted with a view to approximating the comfort and convenience of the private automobile, resulting in the necessity for rehabilitated track, new cars, high standards of maintenance and cleanliness, improved appearance and a higher standard of courtesy and efficiency on the part of all employees. Increased revenue has rewarded its efforts along these lines. Frankness in dealing with the public through its representatives in all the company's affairs and problems has enabled the company to enjoy pleasant relations in all communities through which it operates. Truthfulness and impartiality in dealing with the press have won the confidence and good will of all the newspapers in the district regardless of their political affiliations or corporation policies. A continuous and intensive safety program has materially reduced the number of accidents. Establishment of pleasant relations with its employees has avoided labor trouble and secured the hearty co-operation of all of the men.

Youngstown Municipal Railway Employees' Orchestra Is in Demand for Entertainments

Initial Dinner of the Twenty-Year Service Club Organized Among the Transportation Employees

Handling Accident Claims and Discouraging Litigation

Various Methods of Doing This Were Recommended by Speakers at Monday's Session of the Claims Association—Thursday Morning Meeting Was Devoted Largely to Discussions of Claims-Medical Questions

J. H. HANDLON
President Claims Association, 1925-1926

THE program of the Claims Association at the Cleveland convention was divided into three parts. Monday afternoon was devoted primarily to a discussion of methods of handling accident claims and discouraging accident litigation. The proceedings on Tuesday afternoon are represented in the joint meeting of the Claims Association and the Transportation & Traffic Association, reported in last week's issue. On Thursday morning the Claims Association devoted itself to a consideration of medical and surgical matters.

About 75 claim agents, attorneys and adjusters and safety managers were present at the meeting on Monday afternoon to hear the one address and four papers scheduled. The discussion was very active and presented views on all sides of the subject by delegates from all parts of the country.

The close connection of the work of the claims department and accident prevention was emphasized in an address by Charles E. Scott, president National Safety Council, Chicago. Mr. Scott pointed out the need in accident prevention for the adoption of a definite systematic plan, whether the company was large or small. Any plan lacking definiteness, orderly procedure, continuity or that close amalgamation by which it is sure to become a part of operation, he said, is sure to give disappointing results and ultimate failure. An essential feature of such a plan is the education of the employees to safety methods. Some electric railways tend to over-concentrate the efforts of safety organizations on the education of the public.

The organization of public opinion in America toward the reduction of accidents is of comparatively recent development. It was in 1913 that the National Safety Council was organized in the interest of public safety. It has two reasons for its existence. One is everlastingly to remind the general public that there is an accident problem in America, and the second is to interpret that problem to the general public. The council is trying to awaken the public to its responsibility for the country's deplorable accident situation and its efforts are not being sufficiently utilized by the transportation interests of the country. The value of the council is too often measured by the direct service it gives to its membership. The broader and better view to take is of its general influence on the public at large and that its purpose is the creation of a strong conviction in the mind of the public that we must be a more careful people. No single industry can conduct a national public movement for greater safety. It can be accomplished only through a national organization with a substantial membership having the cooperation of every industry.

In considering electric railway problems primarily, the speaker urged a separation between the claims department and the safety department, particularly in the larger operating companies. Where the two are combined, he said, there is a natural emphasis on the economic reasons for safety work. There should be a constant close, frank and friendly relationship between the two, but the employees of the company must not be led to believe that the company's interest in safety is wholly mercenary.

METHODS OF DISCOURAGING LITIGATION IN ACCIDENT CLAIMS

A paper on this subject was presented by Trevor C. Neilson, claim agent East St. Louis & Suburban Railway, who laid great emphasis on the need of fairness in dealing with claims. Otherwise, he said, the natural antagonism in every community against a traction company will find outward expressions of antagonism. Each individual claims man should check up his own personality on this matter and then consider that of the other members of the staff. Finally, the claims men should be taught to realize the importance of all employees being on the best of terms with the company's customers. Courteous treatment by car crews, when an accident occurs, may go a long way toward cutting out the aggressive attentions of the "ambulance chaser."

In connection with ambulance chasing, the speaker described a recent experience which was unique. There had been a collision of cars, and while there were no serious injuries, a number of female passengers had been jarred somewhat. Representatives of the company's claims department were looking after the injured, when two representatives of a firm of attorneys were also noticed. One posed as a representative of the railway company and treated the persons affected by the accident with very scant courtesy, so little in fact that he was ordered off the premises. The second "runner" then called on the same persons and found the stage all set for a favorable reception. This enabled him to secure the business on a 50-50 basis.

In conclusion the speaker urged fair treatment of attorneys with claims to present and deprecated attempts to make settlements with claimants behind the backs of their attorneys. Nevertheless, he believed that at the time of the presentation of the claim a railway company is justified in pointing out to the claimant that it is to his or her advantage to save the expense of attorney's fees.

In the discussion following Mr. Neilson's paper, a difference of opinion developed as to whether it was desirable for a representative of the claims department to make an early call on a person injured in an accident. Mr. Funk, Louisville; Mr. Jack, Wilmington, Del.; Mr. Drown, Newark, N. J., and others favored the early call as a natural, humane and courteous act. Mr. Robinson, Cincinnati, and Mr. Muir, Memphis, were inclined to the opposite view, on the ground that the person injured might think the call was made from mercenary motives and primarily to obtain a release. Mr. Schmeiser, Aurora, Ill., said his policy was to have injured person sent to the best hospital and after a day or two for a representative of the claims department to call on the patient to show that the railway company has an interest in his welfare. This visit is followed by additional calls. Mr. Sweeney, Chicago, South Shore & South Bend Railroad, has found the best way to discourage ambulance cases is to advise claimants who insist upon litigation to engage the best lawyer that money can secure.

T. C. NEILSON

W. G. MARSHALL

CHARLES B. SCOTT

AUTOMOBILE CLAIMS AND METHODS OF HANDLING THEM WHEN INSURANCE COMPANIES ARE INVOLVED

A paper on this subject was presented by William G. Marshall, manager of the adjustment department, Pittsburgh Railways, who said that in that city the casualty men have an association which conducts semimonthly evening conferences. Ten members of the Pittsburgh claims department are affiliated with this association and find that acquaintance with the casualty representatives is of mutual benefit. There is greater disposition to discuss merits of claims before legal action is brought. This applies not only to accidents caused by trolley cars but accidents to them, as where an automobile collides with the rear of a street car. In cases of this kind, insurance carriers are showing noticeable co-operation in the adjustment of the claims of the company against their assured.

In the past few years a limited amount of liability insurance has been placed by the Pittsburgh Railways covering railway, bus and auto operation. In such cases, the company does not tell the claimant simply to see a representative of the insurance company. It offers an explanation as to the coverage, telephones the insurer in the presence of the claimant and, if possible, makes an appointment for him. In claims made by letter, the acknowledgment gives the name and telephone number of the carrier's representative and information that the claimant's letter has been forwarded to the insurance company.

BONUS SYSTEMS

On presentation of the paper by G. T. Hellmuth, claim attorney Chicago, North Shore & Milwaukee Railroad, on "Bonus System—Its Value in Claim Work," a motion was carried that a committee of three be appointed—with Mr. Hellmuth as chairman and the two other members to be from companies having bonus systems—to prepare and print a report for the midwinter meeting of the executive committee, setting forth a bonus system which they recommend. Mr. Hellmuth said that he did not think bonus plans led to an increase of unreported accidents.

BUS ACCIDENTS

After the presentation of Mr. Drown's paper on "Bus Accidents," in reply to an inquiry Mr. Drown said that in his state the courts had ruled that trolley cars were not included in the automobile right-of-way rule in the traffic law, but the courts have not yet decided whether a bus is so included or not, though it has been classed as a "common carrier."

Mr. Schmeiser, Aurora, Ill., and Mr. Funk, Louisville, Ky., said that on their properties the bus drivers were men who had been street car operators and this plan of promotion was successful.

PRESIDENT URGES CO-OPERATION

In his presidential address, J. H. Handlon, San Francisco, said that the outstanding feature of the work of the Claims Association this year, to him, had been the increasing interest in accident prevention. At the midwinter meeting of committees held in Indianapolis, it was also quite evident that there existed a keen desire for close co-operation between the transportation and traffic departments and the claims department. "The transportation man," said he, "is not now disposed to look upon the claims man or safety engineer as an interloper who has injected himself without leave into the problems of the transportation department. Today the claims man or safety engineer is an invited guest. His aid is sought and his advice welcomed."

Continuing, President Handlon said, in part:

"With the awakening of the transportation man to the fact that he can utilize to his advantage the resources of the claims or safety man, or both, it has dawned upon him that he has at his command the selection and training of the man-power, and that the most efficient safety device known is a careful man. Impressed with this fact, greater care is being exercised than ever before in hiring trainmen. Haphazard methods of selection have been abandoned, and intelligent, modern ideas of classifying applicants for employment have been substituted for them. Students are placed on probation instead of being accepted as full-fledged employees after having passed one examination. They are taught more, examined oftener and watched closer. There is also a growing tendency to see that company rules are rigidly enforced, especially rules designed to prevent accidents."

Physicians and Surgeons Discuss Operating Problems

Delegates Consider Desirability of Company Doctors Taking Charge of Cases of Injured Patrons, Need for Periodical Examinations of Transportation Employees and Other Live Topics

THURSDAY morning's session of the American Electric Railway Claims Association was set apart almost entirely to the discussion of medical and surgical problems. During this part of the session Dr. Frederick L. Mosser, surgeon Third Avenue Railway System, New York, occupied the chair, and while most of the papers and discussion related to the medical aspects of claims, there was also consideration of the medical care and inspection given by some companies to their employees. The meeting emphasized the constantly increasing importance attached by electric railway companies to their medical departments.

The subject was fittingly introduced by a paper presented by Dr. Mosser himself on "Practical Methods of Obtaining Greater Efficiency from the Medical Departments of the Street Railway Companies." It is published in abstract elsewhere, and the conclusions in the paper were considered seriatim in the discussion.

There was general agreement on the need for the prompt examination by the company's surgeon of persons injured in an accident and a prompt report by him of his findings to the claims department. One of the medical delegates present stressed the importance, in this connection, of the surgeon including in his report any statement made by the claimant of the extent of his injury, quoting the exact words used. Experience in a number of cities has shown, he said, that later, after the claimant has discussed his claim at length with lawyers, he is apt to adopt an exaggerated view of the injury and its effects. Discussion also developed the point that several companies were already following the recommendation of Dr. Mosser to follow up physicians who have testified as to permanent neurasthenia conditions, so that they can be checked up in future cross-examinations, and to keep a card index system for future reference of physicians who have testified at trials. Thus, it was pointed out, a doctor may testify in a case that the plaintiff has received permanent injury and the company has to pay large damages. If the claimant recovers completely later and the same physician appears in court again with a similar statement for another claimant, the earlier case can be cited. In reply to inquiries as to whether evidence of this kind is admissible in court, the point was made that it is, because the previous testimony was an official record. Several delegates took exception to the recommendation in Dr. Mosser's paper that the company doctor should not tell the claimant the results of his investigation of the claimant's injury and should not recommend any special course of treatment. They pointed out that advice from a company physician would often reduce the time of convalescence and avoid the possibility of a lasting injury, where the attending physician lacked skill. Dr. Mosser agreed that in some cases such a course might be desirable and the company doctor should use his judgment, but in general he thought his recommendation should be followed.

Another medical paper to receive extended discussion was that by Dr. Miller of Milwaukee on "Health Service Examination and Organization of a Medical Staff for the Care of Injured Patrons of a Public Utility." It is published in abstract elsewhere in this issue. In addition, Dr. Miller pointed out that while the Milwaukee system covers a wide area, his paper was confined to practice within the city of Milwaukee. The author also explained that the company has a private telephone system of its own with a telephone at practically each street intersection or car intersection so that it is a simple matter for a motorman or conductor to notify the medical department promptly when an accident happens. A feature of Milwaukee practice is for company physicians to take medical charge of persons injured by its cars, if they are willing to accept this service.

The speaker was asked whether the company found this policy less expensive than to pay for the attendance of the family physician and whether the latter did not object to giving up his case to the company. Dr. Miller replied that as the system described had been in use in Milwaukee for a long time, it was very difficult to give comparative figures, with the cost of allowing local physicians to take charge, especially as the company doctors care for employees and their families as well as for injured patrons of the utility, and it would be difficult to segregate their expenses completely. He thought, however, that the cost is less with the present plan. As far as opposition from local doctors is concerned, if the system was to be installed today, there would be obstacles which perhaps could not be overcome. Where a recognized physician has already taken control of the case the company physician makes no attempt even to examine the injured person. An advantage of the plan, not mentioned in the paper, is that the medical department is sometimes asked to give medical aid by patrons injured in accidents which have not been reported by the car crews. In the vast majority of cases there is absolutely no opposition from the medical profession in the city to the present plan.

PHYSICAL EXAMINATIONS OF EMPLOYEES

The discussion on Dr. Sibley's paper on "Observations on the Physical Examination of Electric Railway Employees" centered largely upon his remarks regarding high blood pressure and conditions surrounding the work of trainmen from a health standpoint.

Dr. Sibley pointed out that his experience showed the work of transportation men to be a very healthful one. Many trainmen on the Boston Elevated Railway have told him they have not lost time for any sickness for twenty years or more. He also pointed out that of the men mentioned in his paper as having died as the result of high blood pressure only one died on a car.

Mr. Funk, Louisville, said he could not recall any accident on his system having been caused by a man with high blood pressure, and he thought that an effort to retire perhaps 9 to 10 per cent of the employees because the blood pressure was above a certain amount, though many of the men had been with the company for from twenty to twenty-five years, would affect the morale of the organization.

Another delegate pointed out that while on his property a number of older transportation men had been retired because of unsatisfactory physical conditions, they had not been discharged. They were kept in use in other positions at practically the same rate of wages. Cripples were being used as flagmen. Others were in the tailor shop, pressing uniforms for car operators and bus operators, etc. Even if there was nothing for them to do, the company considered it cheaper to put them on a pension than to have the claims department pay out money for damage claims, but he thought that it is possible always to find something for them to do.

RESOLUTIONS PASSED AND OFFICERS ELECTED

At the business session at the close of Thursday's meeting resolutions were passed on the death of Past-President Samuel B. Hare and of John J. Stanley, also expressing appreciation of the hospitality of Messrs. Weh and Kubu and other members of the Cleveland Railway claims department.

The nominating committee reported the following officers for the ensuing year:

President—C. B. Proctor, claim agent Memphis Street Railway.

First Vice-President—J. S. Kubu, assistant superintendent accident department, Cleveland Railway.

Second Vice-President—E. L. Lindemuth, manager claims department Wilkes-Barre Railway.

Third Vice-President—L. F. Wynne, general claim agent Georgia Railway & Power Company, Atlanta.

Executive committee—S. J. Herrell, claim agent Knoxville Power & Light Company; W. E. Robinson, claim agent Cincinnati Street Railway; C. E. Redfern, general claim agent United Electric Railway, Providence; B. F. Boynton, claim agent Portland Electric Company, Portland, Ore.; G. T. Hellmuth, convention secretary, claim attorney Chicago, North Shore & Milwaukee Railroad.

They were unanimously elected.

The installation of Mr. Proctor as president for the ensuing year and the presentation by H. K. Bennett of a past-president's badge to Mr. Handlon concluded the session.

Manufacturer and Railway Man Joined to Make This the "Best Convention Ever"

Accountants Aid in Constructive Policies

Vital Problems Confronting Many Properties May Be Helped by Scientific Accounting Methods—Publicity Should Be Given to Frank and Open Pictures of the Facts, Holds Accountants' Association—Committees Report on Bus Classification, Freight and Other Problems—L. E. Lippett Elected President

MAKING the work of the accountant essential in solving industry problems was the general theme of the sessions of the Accountants' Association at the Cleveland convention. Despite small attendance the discussions developed in the meetings gave insight into many problems and showed the way to more constructive thinking. As the association standardized electric railway accounting a number of years ago it now has standardized bus accounting. Authority was given the committee on this subject to make definite rulings on cases that may be brought to its attention. Other subjects considered included bus accounting, stores accounting, fare collections, freight accounting, and taxation.

In welcoming the delegates to Cleveland at the opening session held Monday afternoon, Oct. 4, Urban F. von Rosen, accountant for the City Street Railroad Commissioner, pointed out that Cleveland, having lived through or now facing nearly every known problem relating to the accounting for and financing of transportation facilities, forms probably the best laboratory for electric railway accountants in the country.

President John J. Duck, in his formal address, congratulated the association on its accomplishment in bringing about a uniform system of accounts enabling a detailed comparison with other properties. Continuing, Mr. Duck said in part:

"We are now in the midst of what appears to be one of the most important periods of our industry. The period of reconstruction, with its great problems, looms up directly before us. Among the most important are depreciation, either by obsolescence or otherwise; increase in the use of buses, that in some cases may result in the abandonment of trackage; public relations with all that that subject entails, requiring more detailed information from the accounting officer to supply the management or publicity department with the facts to enable it to present to the public the truth of how our industry is burdened with expenses that in these days are unjust, such as paving, maintenance of paving, sprinkling and cleaning of streets, and other public benefits imposing increased taxation upon our industry. These are vital problems confronting many properties whose life and existence may be helped by scientific accounting methods.

"This is a day of publicity. Public confidence can be created and encouraged by giving a frank and open picture of facts, and acquainting the public with some of our unjust burdens. Put these figures and facts in language understood by the public, for the public is not always familiar with the accountant's language.

"We should cultivate suggestions from our assistants and clerks who handle the detail, for improvements and short cuts in compiling our figures. Also a survey should be made of our work to find out if we could make more use of the many mechanical devices used in office work. We may find that we can use more of them to improve our work and at a saving that will well justify their purchase."

JOHN J. DUCK

Bus Accounting Standardized

Questions on the classification presented by the committee on bus accounting should be given publicity and official rulings made, according to M. W. Glover, chairman. Everybody knows there are things that are wrong and will have to be changed in time, but in order to get the classification adopted throughout the country it is considered undesirable to make any minor changes at the present time. Companies operating more than 3,000 buses are now using the classification.

The condensed classification submitted by the committee is in no sense a revision of that in the report submitted last year. It is merely a less detailed classification for those motor bus operating companies where the volume of business is not large enough to warrant the use of the full classification.

Adrian Hughes, Jr., pointed out the necessity for cooperation between heads of operating departments and the auditing department. It is essential, he said, not only to get over-all costs correct but to analyze the individual parts of the operation so as to know where we are making money and where we are losing. For this reason he feels that the classification proposed should be used for all bus operations.

After adoption of the report on classification of bus accounts, a motion was adopted giving the committee on bus accounting authority to make official interpretations and rulings on bus accounts, until such time as the Interstate Commerce Commission takes over the matter and is in a position to give rulings.

It was also agreed that any questions and answers arising from interpretations of the accounts should be

LESLIE VICKERS, ECONOMIST OF THE A.E.R.A.

published from time to time in ELECTRIC RAILWAY JOURNAL, *Bus Transportation* and *Aera*.

The principal criticisms, according to Mr. Glover, were with respect to division in groups. Certain items which are now in the group of garage expenses were classed as maintenance items, others as transportation items. The groupings were made to agree as nearly as possible with the electric railway classification.

E. A. Tuson, Newark, N. J., explained that three classes of accounts were made to cover maintenance, movement costs and transportation.

A resolution of appreciation of the work of W. F. Ham, a member of the committee on the classification of accounts since its organization in 1897, was passed. Mr. Ham has resigned from the committee because of the press of other duties.

The address of the afternoon was delivered by Carl H. Nau, C.P.A., of Nau, Rusk & Swearingen. He defined the accountant as a very important factor in a company. His work is far more than that of bookkeeping or auditing, as he must be able to plan expenditures and be skilled in the affairs of commerce and finance. In closing, he expressed the debt of his profession to this and similar organizations for the constructive work they have done.

Fare Collection Methods Discussed

Registration in Addition to the Fare Box Is Favored by Accountants—Successful Use of the Weekly and Sunday Pass in Several Cities Described

ON TUESDAY the first part of the afternoon was devoted to a joint session of the Accountants' and Engineering Associations, the subject being depreciation. The principal paper on this subject was presented by Prof. Henry E. Riggs of the University of Michigan. A report of this session appeared in ELECTRIC RAILWAY JOURNAL for Oct. 9, page 618. Following the close of the discussion on Professor Riggs' paper the members of the Accountants' Association resumed their regular session.

A resolution offered by T. B. MacRae upon the death of John J. Stanley was adopted by a rising vote.

The report of the committee on fare collections was presented by its chairman, E. A. Tuson of Newark, N. J. In the ensuing discussion it was pointed out that in all cases registration is recommended in addition to the fare box record. There was some question as to whether all fares should be registered or only those which are not placed in the fare box. Following the discussion the report was adopted as submitted.

O. H. Bernd, Des Moines, told the association about the experience in his city with the weekly and Sunday pass. The Sunday pass was inaugurated on June 4 and was found to give an additional revenue of $300 a Sunday or about 6½ per cent. Special counts made by the conductors showed that the pass holders were taking many more rides than they previously had when paying cash fares.

J. P. Longon, Cincinnati, was also enthusiastic about the use of the pass on his interurban line. The car operators are furnished with green checks, one of which is deposited in the fare box when the passenger displays his pass for fare. This gives a check on the number of rides taken by pass holders.

On the Chicago Rapid Transit Company's lines Mr. MacRae stated that a check is kept by means of Veeder counters which are operated by the station agents.

H. E. Vordermark, Fort Wayne, stated that in his city passes were put on for political reasons some three years ago. The pass created good will with the public and has enabled the company to keep up the rate of cash fare. He is in favor of the pass and would not want to give it up.

The only difficulties that have been found with weekly passes have been due to certain persons obtaining admission to the car and then throwing the pass out of the window for others to ride. The opinion was that this is easily taken care of so as to present no particular difficulty.

Freight Accounting Considered

Use of Three-Part and Five-Part Waybills Discussed at Final Meeting—Resolutions Adopted and Officers Elected for the Ensuing Year

FREIGHT accounting occupied the greater part of the time at the Thursday session. Previous to its presentation the report of the committee representing the Accountants' Association at the annual convention of the National Association of Railroad and Utilities Commissioners, of which W. L. Davis, Allentown, Pa., was chairman, was read and adopted into the record.

The report of the committee on freight accounting was read by the chairman, O. H. Bernd. A lively discussion ensued. W. A. Blasing, Albany, N. Y., stated that the Hudson Valley Railway has changed from the practice of making the waybills at the point of origin while the freight bills were made at destination. The agent at the forwarding point makes out the freight bill and the waybill all in one writing, so the destination agent has no freight bill to make out.

C. A. Dugle, Rushville, Ind., said that some years ago the Central Electric Railway Association adopted the five-part waybill, but it was objected to by some roads doing an interchange business, so that both the five-part and the three-part waybills are now used. O. A. Small, South Bend, is of the opinion that the five-part waybill, including the expense bill for the use of the destination agent, has been almost entirely eliminated. This is because of confusion from having the originating company's imprint on the freight bill.

Walter Shroyer, Anderson, Ind., feels that the American Association can afford to follow the work of the

M. R. BOYLAN AND A. J. WARNER

J. P. BARNES AND H. A. NICHOLL

C.E.R.A. and the steam roads. He believes the unit waybill, carrying with it the freight and expense bill, is the one for electric railways. It was the opinion of Mr. MacRae and Mr. Duck that where there is interchange with a steam railroad the electric line will almost be forced to adopt the latter's methods.

Following the discussion the report was adopted as an interim report.

The report of the committee to review the proceedings of the Accountants' Association was read by its chairman, J. E. Heberle, and adopted without discussion.

A paper on "Transportation and Taxation" was read by A. F. Elkins, manager Peat, Marwick, Mitchell & Company.

Depreciation of amusement park property was brought up for discussion by Mr. Lyons. If the receipts could be classified as auxiliary operating revenues and the expenditures as auxiliary operating expenses he feels it would assist to accomplish the desired result. It was the opinion of those present that the classification must follow the standard set by the state commission, but that in some cases the accounts may be carried in two different forms to cover the item on the company's books and in the commission report.

C. R. Mahan read the report of the resolutions committee in the absence of Chairman May. Appropriate resolutions were adopted acknowledging the efforts of the retiring president, and expressing thanks for his successful administration, for the efforts of the committees, for the speakers, for the technical press, and for the courtesy of Mr. Bernd in acting as convention secretary.

OFFICERS ELECTED FOR THE ENSUING YEAR

The committee on nominations, T. P. Kilfoyle, chairman, presented a list of names for the various offices. These were duly elected as follows:

President—L. E. Lippitt, general manager Auburn & Syracuse Electric Railway, Auburn, N. Y.

First Vice-President—T. B. MacRae, general auditor Chicago Rapid Transit Company, Chicago, Ill.

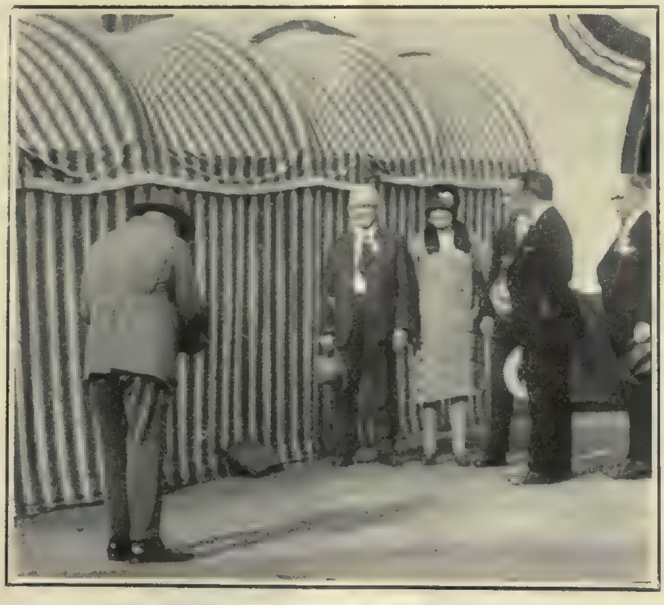
Second Vice-President—O. H. Bernd, secretary Des Moines City Railway, Des Moines, Iowa.

Third Vice-President — Edwin H. Reed, auditor Brooklyn City Railroad, Brooklyn, N. Y.

Secretary-Treasurer—J. W. Welsh, executive secretary American Electric Railway Association, New York City.

Executive Committee—C. E. Yost, auditor and assistant treasurer Wilmington & Philadelphia Traction Company, Wilmington, Del.; J. E. Heberle, assistant to president Capital Traction Company, Washington, D. C.; Edward A. Tuson, general auditor Public Service Railway, Newark, N. J.; C. R. Mahan, auditor Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

President Lippitt then took the chair, and after pledging his support to the association, called on the other new officers for remarks. After presentation of the past-president's badge to Mr. Duck, the meeting adjourned.



GETTING ILLUSTRATIONS FOR THE DAILY—
C. L. HENRY AND PARTY POSE

Bonus or Award Systems*

More than Fifty Companies Have Found the Plan Successful in Reducing Accidents, Accident Claims and Unreported Cases —Bonus Plans Offer Inspiration to Continue Safety Work

By G. T. Hellmuth
Claims Attorney
Chicago, North Shore & Milwaukee Railroad

G. T. HELLMUTH

AT PRESENT there are at least 50 electric railways in the United States using one variation or another of the bonus plan for the reduction of accidents. The list of users includes companies in very large cities as well as in small communities, for example: Birmingham, Brooklyn, Denver, Los Angeles, Milwaukee, Louisville, St. Louis, Washington, D. C.

So far as I know, there are only two reasons given for their attitude by those who do not believe in the bonus plan. First it is said by some objectors that it is not right in principle to reward men for doing unusually well what they have already been paid to do. Such a position, it seems to me, is equivalent to the argument that one ought always to work in whatever endeavor one is engaged, without any expectation of promotion or increase in pay. Such a situation would deaden for me both initiative and mental activity. In fact, I do not think it would be too broad a statement to say that to work with the definite knowledge that no sort of reward could be expected, either in the shape of a promotion or a pay increase, would inevitably take from any individual the incentive for extra effort. And it is the extra effort, and extra effort only, that will produce results above the average.

The second objection advanced to the use of the plan is that trainmen will attempt to keep their accident records clear by omitting to report some of their accidents. However, this situation, as may be ascertained by examination of some of the plans contained in my files, has been anticipated and successfully handled by a provision that an unreported accident will be scored as two accidents, or demerits, against the individual failing to report. Consequently, so far from producing unreported accidents, the adoption of the plan has had just the opposite effect and has resulted in users of the plan being able to reduce their unreported accidents.

I would like to call attention to one representative plan—the one in use by the Nashville (Tenn.) Railway & Light Company. There the year is divided into three contest periods of four months each and at the beginning of each contest the company sets up a bonus fund of $1,500. The contest consists of a comparison in each four months contest period with the corresponding four months of the previous year. If there are more accidents during any contest period of the current year than there were during the corresponding period of the previous year $20 is deducted from the fund for each accident above last year. For every accident less than the number charged during the same period during the previous year $20 is added by the company to the bonus fund of $1,500, but an unreported accident is counted in getting at the total of the contest period as two accidents. This means that unreported accidents will cut sharply into the fund distributed among all the employees. Consequently, unreported accidents are at a minimum with the Nashville Railway & Light Company.

Brief extracts from comments by officials of some of the railway companies using the bonus plan follow:

> We started our bonus system in 1923. . . . Since the system was inaugurated we have had but one blind case. . . . The amount received by each man with a clean record is from $15 to $20, each six months. We feel that the bonus system has resulted beneficially in every way.—BUTTE ELECTRIC RAILWAY, Butte, Mont.
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> This plan has undoubtedly reduced the number of our accidents and in doing so has reduced our claim costs. . . . You will be surprised how our men covet the Star Class and how hard they strive to reach that goal.—CHARLESTON INTERURBAN RAILROAD, Charleston, W. Va.
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> In 1919 we began giving a bonus to the platform men and others eligible under the rules governing the bonuses. For the ten years preceding 1918 the average cost of the claim department was 12 per cent of the gross passenger revenue earned. For the years 1919 to 1924 inclusive the cost was 5.72 per cent; for the year 1925, the cost for the first six months was 3.25 per cent. . . . We have been able to reduce our pull-ins from 350 per month to 49 per

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*Abstract of a paper presented at the annual convention of the American Electric Railway Claims Association, Cleveland, Ohio, Oct. 4-8, 1926.

month.—Tennessee Electric Power Company, Chattanooga, Tenn.

Our figures show a decrease in accidents from 1923, when the bonus system was started. . . . In the final analysis, to have the men interested in their work is the best accident preventive, and we think this interest is produced by the spirit of competition and personal gain.—City Railway, Dayton, Ohio.

We feel that its popularity and benefits (of the bonus system) are constantly increasing, and we have watched the program very carefully and with much interest.—El Paso Electric Company, El Paso, Tex.

The Gary Street Railway is sold on the five-day-a-year vacation bonus plan.—Gary Street Railway, Gary, Ind.

The merit system has succeeded beyond our expectations, and after five years the higher officials of the company, as well as all others in authority, could not be prevailed upon to abandon it, nor would the trainmen themselves give their consent to such a course.—Los Angeles Railway, Los Angeles, Cal.

The first year the plan was in operation the men received 1.65 cents per man-hour; the second year 2.60 cents. During that period our total accident costs were reduced from 5.59 per cent to 3.43 per cent of gross. Outstanding liability was reduced 36.8 per cent; number of accidents 34.3 per cent, and cost of repairs to equipment damaged in accidents, 64.6 per cent. The turnover of men during this same period was reduced 63 per cent.—Memphis Street Railway, Memphis, Tenn.

In 1921 the company expended 9.5 per cent of its gross revenue in settlement of accident claims; in 1922, 6.2 per cent; in 1923, 5.8 per cent, and in 1924, 3.4 per cent. During 1923, the first year of the bonus system, claim costs amounted to $128,638. This amount was reduced to $77,284 in 1924, the latter amount including the bonus awards, which totaled $9,640. . . . We attribute the net savings of $51,354 largely to the bonus system. . . . This company expended 3.2 per cent of its gross revenue in settlement of claims during the six months ended June 30, 1925, as compared with 4.5 per cent of its gross revenue expended for the same purposes during the first six months of 1924.—Nashville Railway & Light Company, Nashville, Tenn.

We feel that the bonus method has increased the number of reported accidents, whereas before the institution of this system there were numerous slight accidents which were considered by the crews too trivial to report.—West Penn Railway, Pittsburgh, Pa.

In February, 1921, our company inaugurated its trainmen safety contest. . . . The first statement, or that for the year ended Jan. 31, 1922, and the statement for the second year, or that ended Jan. 31, 1923, follow:

REDUCTION IN PER CENT OVER PREVIOUS YEAR

	First Safety Year	Second Safety Year
Accidents	15.9	24.6
Claims	16.9	24.5
Collisions of cars	48.1	66.7
Personal injuries serious	43.3	42.0
Personal injuries not serious	18.3	24.6
No reports	27.2	47.8
Deaths	40.0	43.7

—Washington Railway & Electric Company, Washington, D. C.

The Milwaukee Electric Railway & Light Company has enlarged and added to the scope of its award plan.

Going outside our field we find that prizes are given in Cleveland to careful taxi drivers and that Armour & Company distribute bonuses to "better than average" employees.

While the plan is largely in use, to those of us who do not use it it is a new way of aiding in our work of accident prevention. Accident prevention is the finest and highest development of claim work. We have all preached it; we have all contributed as best we could to it. To be most effective, it must be carried on continuously. When one method becomes stale, fresh inspiration is needed to "carry on." I think that we can obtain it through use of the bonus and award plan.

Bus Accidents

Their Causes and Successful Methods of Prevention*

Last Year Bus Accidents per Million Passengers Were Higher on Public Service than Trolley Car Accidents—Causes of Bus Accidents Analyzed and Remedies Suggested

By **H. V. Drown**

General Claim Agent Public Service Railway and Public Service Transportation Company, Newark, N. J.

H. V. Drown

In the fall of 1923 Public Service decided to go into the bus business and in July, 1926, was operating 833 buses on 101 lines, most of the lines having been formerly operated by so-called independents. The company, however, has discarded most of the buses taken over, as almost every known type and manufacture of bus was included. In their place it has in operation 729 new buses and further replacements will be made when practicable. These buses are operated by the Public Service Transportation Company, but this company is jointly managed and operated with the Public Service Railway.

When confronted with the problem of handling bus accidents, naturally the first questions to arise in one's mind are: What will they amount to? How much work will be involved? My own first thought was they would be less troublesome and expensive than those with cars and that a vehicle not confined to rails would have a distinct advantage. My experience has been that while the bus has the advantages mentioned, it also has disadvantages to be reckoned with. It is a smaller vehicle carrying considerably fewer passengers, and while our last year's operation showed 442.46 accidents per million bus-miles against 444.99 accidents per million car-miles on the railway, there were 82.86 accidents per million passengers for the buses as against 51.91 for the railways.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Claims Association, Cleveland, Ohio, Oct. 4-8, 1926.

THE BUS MORE FRAGILE THAN THE CAR

The bus is a much more fragile vehicle than the trolley, and in severe smashes it is more susceptible to being crumpled up, with consequent injurious effects to passengers. While the bus is not held to a fixed course, as is the car on its rails, this advantage is at least partially offset by the fact that in turning from its course the bus may sidewipe other vehicles or otherwise get into collisions with vehicles in congestion. Then the bus with its rubber tires may skid on slippery pavements.

In arriving at conclusions based on our experience for the first full year, claims men will, of course, take into consideration that on a new proposition such as this, all things being equal, claim costs will increase from year to year until a peak is reached, due to the necessary delay in liquidating certain claims, particularly those that have gone to suit. Our expenditures on account of bus accidents for the first year, including everything chargeable to the accident and damage accounts, amounted to 3.17 per cent of the revenue. For the same period the claim cost for Public Service Railway amounted to 5.37 per cent of its revenue. On this showing alone, I would assume that in about four years, when I should expect the bus percentage to hit its peak, it will at least equal and more than likely exceed that of the railway, but I confidently expect that it may be kept lower through the beneficial effect on the accident situation of standardization and improvement of equipment and operation, toward which great strides have already been made. I also look forward to marked improvements in traffic regulations which will materially help.

Our expenditures for the last year amounted to $253,263, divided as follows: For personal injury claims, $93,404; property claims, $78,458; workmen's compensation, $21,885; expenses $59,516. The accompanying table shows the percentage of accidents by classifications to the total number of accidents for both buses and trolleys respectively, coupling like or similar classifications.

CHARACTER OF HAZARD NOT GREATLY DIFFERENT

It is apparent from the comparisons in the accompanying table that there is not a great deal of difference between the character of accident hazards arising out of the operation of the two vehicles. Our railway claim men took up the work with practically no difficulty. However, I think there is sufficient difference in the operation to justify separate printed forms and records throughout. We did this of necessity because the bus company was a separate corporation, but even where the business is merged with the railway I should deem it an advantage to keep separate records. There is sufficient difference in the physical layout to warrant it, and the records afford opportunity for profitable study.

As to the cause of bus accidents, there are three general causes, and this statement applies to trolley car accidents too. In the order of their frequency they are, first, negligence on the part of the public; second, negligence on the part of employees, and third, defects in construction and equipment.

To minimize the first, we are dependent on various educational features well worked out through this association and allied bodies, on the enforcement of existing traffic laws and ordinances and on enactment and enforcement of additional regulations when necessary. Where the proposition is large enough to justify it, the services of the National Safety Council will be found well worth while. Probably the greatest opportunity right now for bringing about a reduction of bus accidents lies in the direction of better traffic regulations, particularly in the direction of parking, of exceeding the speed requirements at highway and street intersections and of "keeping the line" in heavy traffic.

CLASSIFICATION OF BUS AND TROLLEY CAR ACCIDENTS IN PERCENTAGES OF TOTAL NUMBER, PUBLIC SERVICE OF NEW JERSEY, YEAR ENDED APRIL 1, 1926

Type of Accident	Bus	Trolley
Collisions with automobiles	49.05	52.81
Boarding and leaving	7.10	7.29
Employee accidents	6.53	3.47
Collisions, bus with bus or car with car	5.20	2.35
Collisions, bus with car or car with bus	3.97	(a) 4.93
Accidents involving injuries to passengers while on bus or car	3.47	3.58
Collisions with fixed objects	2.26	(b)
Pedestrians struck	1.81	2.17
Derailments	(c)	1.18
Collisions with wagons	1.13	1.40
All other accidents	19.48	19.82

(a) Includes collisions of cars with independent buses; (b) no such classification with cars; (c) no such classification with buses.

In minimizing the negligence of the employee, much can be done in the original selection of the man, and then in giving him proper and sufficient training.

Defects in the construction and equipment of buses are, if anything, more harmful in relation to accidents than in the case of trolley cars. It is therefore highly important that the bus be constructed with due regard to safety and maintained in as near a state of perfection as is practicable.

STANDARD COMPANY BUSES DESIRABLE

Standardization is most desirable, so that the operator in shifting from one bus to another will find conditions with which he is familiar, so that when the emergency arises he will not have to stop to think, for that moment, so often fatal. Uniform widths and lengths of buses count much in obviating costly mistakes in judging clearances. The matter of clearance comes into play very frequently, not only in straightaway running, when other objects are being passed, but also when the bus must deviate from its course, particularly in turning to or from the curb, where a miscalculation may result in sidewiping other vehicles.

The steering apparatus merits a lot of attention. Here the trolley car has a great advantage as, confined to its track, it is practically a self-steerer. The brakes should be of the best type and be serviced up to the minute. With traffic already highly congested and still increasing steadily in density and with four-wheel brakes appearing in increasing numbers, even on the cheaper and lighter autos, by means of which they may be stopped in their tracks, so to speak, good braking equipment is increasingly essential.

Greater Efficiency from the Medical Departments*

Suggestions on Ways in Which the Company Doctor or Surgeon Can Be of Greater Help to the Claims Department, Particularly in the Information Given in His Reports

By **Frederick L. Mosser, M.D.**
Surgeon Third Avenue Railway, New York

F. L. MOSSER, M.D.

PRACTICAL methods which will produce greater efficiency from the medical departments can be obtained in two ways: (1) The medical examiner can select for employment the standard, healthy individual, and (2) the railway surgeons can render to their claim agent or legal department, instructive, intelligent and helpful reports, covering their examinations of those individuals who have been injured in accidents. It is my intention to address you mostly on the latter subject. I shall not dwell long upon the former, except to say that the examination of a prospective employee should be undertaken in a regular, systematic way. In this connection, several points stand out as prevailing topics of the times, and may work great harm or great benefits to railway corporations.

As to the harm: I think principally of the danger of impending legislation in many of our states which will permit employees to choose their own physicians in workmen's compensation cases, and it is recommended that proper committees be organized by those interested to work against the passing of such legislation in any of our states.

As to the benefits: (a) The periodical examinations of all employees is recommended by most of our corporation surgeons. (b) The maintenance of competent first-aid captains. Dispensary and hospitalization facilities under the direction of the industrial surgeon are beneficial to those employees who are injured in the discharge of their duties and are facilities of which they are in duty bound to avail themselves. Lastly, under my first group division, let me call your attention to the great necessity of maintaining a well-equipped and efficient welfare department. Such a department can help employees greatly by posting notices warning of impending epidemics and of social and economic disturbances. These warnings not only benefit the employees of street railway companies, but all industrial organizations and corporations.

In the second group division, namely, the relations between the examining surgeon on accident cases and the claim agent and legal departments, let me suggest that one of the most important essentials is the selection of competent medical men, those with considerable experience, especially those who are alert and willing to make the examinations when assigned to them without delay. You will concur with me when I say that to make the examination immediately after the accident is reported, or as soon after the accident as can possibly be arranged, does more to discourage malingering on the part of a claimant and more to keep ambulance chasers away from your cases than anything else with which I am acquainted. The net results to my mind of a quick and concise surgeon's medical report to the claim agent represents 100 per cent efficiency.

HOW THE SURGEON CAN HELP

Practical help can be further rendered to the claim agent by the examining surgeon in the manner indicated as follows, which I will set forth under suggestions or topics for your consideration and discussion in order to save time. These suggestions or topics I believe will prove instructive and of a material aid to those who are called upon to interpret intelligently the surgeon's report rendered to claim agents.

1. A surgeon's report will help greatly by giving the physical characteristics and make-up of a claimant

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*Abstract of a paper presented at the annual convention of the American Electric Railway Association, Cleveland, Ohio, Oct, 4-8, 1926.

such as: age, weight, married or single, etc., together with the type of claimant, as if, in your opinion, he is truthful or is inclined to exaggerate or malinger.

2. Before an examination of a claimant, it is well for the surgeon to have the claimant specify to him in the claimant's own words a detailed account of the alleged injury. This helps the surgeon not only in the making of his report but, in the course of his examination, to discover some condition not claimed by the injured, such as hernia. Do not apprise the claimant of your findings by spending too much time over such a fact; but continue with your examination.

3. In cases of fractures or sub-luxations, the surgeon should make clear in his report whether it is a case of bad union; whether there will be a shortening of the limb; whether a limp will persist, or whether the limb, when union is completed, will properly function; state if there is any possibility that the result of any fracture or sub-luxation will interfere with the plaintiff following his regular occupation. This latter is very important. In examining injuries to the spine or sacro-illiac joints the surgeon as a rule finds no objective symptoms. In these cases the surgeon should try to reserve the right to get X-ray pictures, if such a procedure is later approved by the claim agent. In the examination of eyes, ears, nose, throat, etc., or in fact any special condition, it is also advisable for the surgeon to reserve the right to employ the services of a specialist, if necessary, or if thought advisable later on in the case.

4. *Neurasthenia*—After the trial, claimants whom physicians have declared to be permanently neurasthenic should be followed up to learn whether these doctors are in error. This procedure can be used in subsequent cross-examinations of the same doctor. In similar cases a card index record of physicians who have testified at trials has been found to be of great value for references by the legal department in future cases. This, not only refers to neurasthenia cases, but in all permanent injury cases. The surgeon's report of neurasthenia cases could also well include the following:

(a) Does claimant appear of the type that will be susceptible to suggestions?

(b) Is there anything about the physical condition of the claimant that could be a producing cause of neurasthenia?

(c) A concise and complete history of any previous medical or surgical records that can be obtained, is naturally a great assistance at the trial.

5. *Women*—In reporting the examination of women claiming miscarriage the following suggestions will help the claim agent to interpret the surgeon's report:

(a) How long has she been married?

(b) How many children has she had?

(c) Has she ever had any previous miscarriages; if so, at what months?

(d) In your opinion, is an apparent constitutional condition the cause of miscarriage? Where have previous children been born, at home or a hospital? If in a hospital, try and obtain the name of the institution.

6. Where the examiner finds some condition is alleged, that he believes or knows could not be caused by such an accident as a claimant describes, it is very helpful for the surgeon's report to give a statement to that effect, suggesting some authority if possible. For example, where the claimant alleges an assault and claims hernia from a probable kick in the abdomen, it is generally conceded by the authorities, I believe, that violence of that kind cannot cause a hernia unless there is a penetration of the abdominal wall.

7. It is helpful if the surgeon's report states whether he knows the attending physician, and if he does, whether the physician is a man of ability and honesty, and if he would be apt to be persuaded by his feeling toward his patient.

8. The surgeon's report to the claim agent should say whether the claimant's injury has dangerous possibilities. This should be specifically mentioned. It should also give a statement of the alleged injuries which cannot be verified by the surgeon, and whether in the surgeon's opinion the case will be a hard one to dispose of. In the latter, aggravation from old conditions must be thought of and in the examining of pregnant women, whether the surgeon finds any reason that might lead to a miscarriage, such as nervousness, etc. Acquaint your claim agent with these facts.

9. The surgeon's report should give his opinion as to whether the claimant is being properly treated by a competent physician, and if there is any possibility or danger of a bad result therefrom.

10. The examining surgeon should never indicate to the claimant by his actions or verbally what his findings are, nor should he direct or suggest any treatment.

TOPICS TO BE EMPHASIZED

In conclusion, permit me to reiterate the topics which to me seem important.

1. The danger of permitting employees to choose their own physicians in workmen's compensation cases.
2. The advisability of immediate examination after an accident and the examining surgeon's prompt report of such to the claim agent.
3. The following up of physicians who have testified as to permanent neurasthenia conditions, so that they can be checked up in future cross-examinations, and the keeping of card index systems of physicians who have testified at trials for future reference.
4. Concise and intelligent reports should acquaint the claim agent with the proper explanations as to conditions found and the probable results. I speak especially of neurasthenia, fractures and dislocations and information regarding accidents to pregnant women, miscarriages, etc.
5. The surgeon to report about the reliability of a claimant's physician and whether the claimant is receiving proper treatment.

COMMITTEE ON MEDICAL AND SURGICAL WORK

The committee on medical and surgical work of the Claims Association this year consisted of:

Dr. Frederick L. Mosser, chairman, surgeon Third Avenue Railway System, New York, N. Y.

Dr. A. S. Driscoll, railway surgeon Richmond Light & Railroad Company, Staten Island, N. Y.

Dr. C. H. Ernst, surgeon the Wilkes-Barre Railway Corporation, Wilkes-Barre, Pa.

Dr. H. A. MacLean, chief surgeon Virginia Electric & Power Company, Richmond, Va.

Dr. Ernest W. Miller, surgeon the Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

Dr. B. E. Sibley, surgeon Boston Elevated Railway, Boston, Mass.

During the past year the committee has been active in carrying on the work outlined for it by the Claims Association. It has been in communication with many surgeon members, and judging from the many replies received, the committee reported a very general increased interest on the part of every one in the work and a desire to co-operate. The program of the medical and surgical session of the Claims Association at the Cleveland convention on Thursday morning was under the direction of this committee.

The Medical Department and the Injured Patron*

The Proper Kind of Organization and a Well Selected Personnel Are Essential to Success—In Milwaukee Good Results Have Followed Permission to District Physicians to Take Outside Practice

By **Ernest W. Miller, M.D.**
Surgeon Milwaukee Electric Railway & Light Company

SUCCESS of any enterprise in these times depends largely upon the formation of its forces into a well-balanced, smoothly operating organization, with careful selection of its units. This discussion is confined to public utilities in cities of not less than 100,000 people, as it is my belief that a utility medical staff for the care of injured patrons can scarcely be organized with economy in smaller cities. It is also essential that the foundation for such organization be based largely upon the relations between the medical department, the claim department and the public. These relations should be extremely close, yet this relation must never be stressed to the point of spreading even the suggestion that the medical department is an adjunct to, or an accompaniment of, the claim department.

For 30 years it has been the pleasure of the Milwaukee Electric Railway & Light Company to render medical and surgical care to a large majority of patrons injured on its lines. Institution of such medical service at this particular time would undoubtedly meet with many obstacles unheard of 30 years ago.

The plan which many public utilities have of engaging medical men to make examinations of injured patrons immediately and pass them on to some other physician for treatment, can in most cases meet with but indifferent results at the best.

The initial step in an organization of this character is proper selection of a head or chief. It then remains for the head to select such associates as may be qualified for this particular kind of work.

As years go by, I am more convinced that to serve the patrons of a public utility properly, the medical man must be born, not made. It requires men with a broad view of life; men with more than ordinary tact and diplomacy. During the past fifteen years, the Milwaukee Electric Railway & Light Company has found that only about 50 per cent of the medical men who apply for positions on our staff qualify to carry the work to a successful conclusion.

The chief surgeon or head, having selected carefully the personnel of his department, must outline the most economical distribution of duties. The division of our city into eight districts has made much improvement in the handling of injured patrons. Primarily there is a smaller territory for the physician to cover; he can arrive at the scene of an accident with no loss of time, and in the course of a few years he can extend his acquaintance within the district in which his work is confined. The medical department of our utility cares for about 4,000 injured patients a year, which is something like 90 or 95 per cent of all those injured.

E. W. MILLER, M.D.

The physicians selected in these various districts, while on the payroll of our company, are not full-time employees. They are obligated to carry on our work at all times, but in addition are permitted to extend their private practices. This removes much of the stigma which in the past has befallen the title of "company doctor" or "company physician." Indeed, now it quite frequently happens that the injured patron has been for some time a personal patient of the doctor in question.

ALSO ATTEND EMPLOYEES AND THEIR FAMILIES

The work of our district physicians has been further augmented by the rendering of medical and obstetrical care to employees of our company and their families within the districts in which each physician resides. The medical service is primarily for the benefit of the employees and their families, but secondarily it has the advantage that the satisfactory medical care given to the employees and their families by these district physicians spreads further the favorable contact of the physician. The medical care of employees and their families is organized under and paid for by the Employes Mutual Benefit Association. The combined remuneration for the care of injured patrons and medical service to employees and their families is sufficient to make possible employment of well-trained and carefully selected medical men.

Each district is equipped with a surgeon's office at its carhouses and other properties, so that the district physician may remove his patient from the scene of accident to one of these offices for first-aid treatment. In case an accident happens near one of these offices, the motorman or conductor almost without fail will transport the injured person to these localities, where, in many instances, the physician is awaiting their arrival, having received notice by telephone of the accident and of the disposition of the injured. The physician in each district is instructed to report immediately to the chief surgeon, or his first assistant, the condition which he finds after the examination of any injured patron. If the condition found is other than a minor one, or one which does not come under the scope of the general practitioner, the case is referred to the chief surgeon, or his first assistant, for subsequent treatment and if hospitalization is necessary, the patient is immediately sent to an institution and cared for at the expense of the company.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Claims Association, Cleveland, Ohio, Oct. 4-8, 1926.

Further facilities for caring for patrons and injured employees, and also for medical diagnosis and treatment of employees and their families, are afforded by central offices in the Public Service Building. These offices are equipped with the most modern means for diagnosis and treatment and are centrally located, making them readily available to the entire territory served by our utilities. The executive work of the medical department is carried on in these offices. The office hours are spread over practically the entire day. Regular office hours are held regularly by the district physicians at each of the local district offices further to accommodate the convenience of the employees and their families as well as injured patrons.

Subsequent to the telephone report of the condition found by the district physician, a written report of each injured patron must be in our claim department within 24 hours after the doctor has made his examination. These reports are supplemented from time to time as new conditions may arise, or as progress is noted in the recovery. This enables the claim department to have frequent information as to the possibility of the opportune time for effecting a settlement in the event that immediate settlement is not possible.

Weekly reports are sent to the chief surgeon by each district physician, incorporating the name of the injured patron, the dates of treatment and the progress of the case. These reports may be transmitted to the claim department, giving them a complete survey of the cases for which the medical department is caring. Frequent staff meetings are held for discussion of all cases of injuries to patrons, as well as topics of general interest to the members of the staff. These staff meetings are probably as valuable to the claim department as anything we can do.

FOUR ADVANTAGES CITED

The advantages of an organized medical service, such as I have briefly described, are manifold. First, it gives immediate knowledge of the condition from which the injured patron is suffering. Second, it insures to the injured patron adequate and thorough medical and surgical service, thereby in many instances minimizing the permanent disability which might arise; I could cite a number of cases where claims for personal injury have been reduced thousands of dollars by rehabilitation and reconstruction work necessitated by primary unqualified medical attention. Third, such service establishes a better relation between the public and the utility. Fourth, the complete care of any given case is a marked advantage in the event of litigation. Fifth, organized medical and surgical service effects economies to the public utility.

Physical Examinations of Employees*

Every Uniformed Employee More than 50 Years Old in Boston Is Examined Yearly and the Results with the 900 Men So Tested Last Summer Are Given—High Blood Pressure Considered Most Important Pathological Condition

By **Benjamin E. Sibley, M.D.**
Surgeon Boston Elevated Railway

LAST year at Atlantic City I presented a paper on the "Routine Methods of Physical Examination of Employees." That discussion was based on the examination of 1,200 men during the summer of 1924 and on the physical examinations given to all uniformed men employed by the Boston Elevated Railway, about 28,000 in all. This number includes all car and train operators who have entered the service since 1901. Two years ago, all uniformed employees 50 years of age, or over, were re-examined. Beginning with this year, the company has adopted the policy of examining the men who are 50, or over, every year. We have just completed the physical examination of 900 men ranging in age from 50 to 76 years, and the present discussion is based largely on the conditions found in this group.

After considerable experience in studying the physical condition of street railway employees, I have become a firm believer in the importance of making yearly examinations of the older men. After 50 years of age, the development of changes in arteries, heart and kidneys becomes most important, and there arises the necessity of a change in the personal habits and hygiene of these individuals. This health axiom is well known to many but we are dealing with a class of men who give little thought to personal hygiene and health, until conditions arise which interfere with their work.

Yearly physical examination and advice to these men will do much to prevent and retard the development of those organic changes which appear in this era. Loss of time may be minimized and years of service lengthened.

I have found that periodical examination stimulates the interest of the men, and impresses them with the importance of following the advice given. Without a regular "follow up," the things the doctor said are often forgotten, and nothing is done until some serious condition develops and causes disability.

Each year I find men who have done nothing to remedy the defects found, and they are again impressed with the importance of attending to physical ailments at once. Each year I am also gratified to find an increasing number of men who return with pathological conditions corrected.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Claims Association, Cleveland, Ohio, Oct. 4-8, 1926.

In a group of 74 men with blood pressures of 200 or more, 42 per cent were able to get reductions to points below 200. Cases of albumen and sugar in the urine have been cleared up, trusses secured for herniæ, and bad conditions of the teeth remedied. A man this summer proudly displayed a set of artificial teeth which had displaced some very bad ones he had when examined previously. He said that his chronic indigestion had disappeared and he had gained 10 lb. in weight.

The interest and co-operation of these men has been gratifying. Over and over again they tell me that they regard the examination as a good thing. They ask many questions about their condition, and when given a "clean bill of health" are very much pleased. When told of conditions which need attention, they are very willing to do whatever is advised.

Moreover, this spirit of appreciation and co-operation is growing each year. This is true because the men realize that the examination is not a means of finding some reason for laying them off, but rather to keep them in health and on the job longer. Every man is told the results of his examination, and if he needs treatment he is sent to his own physician. He is given a blank form covering heart, urine and blood pressure for his doctor to fill out and return, so that we thus obtain a further observation and check-up on whether medical aid has been sought.

The examination is not a long one. Eyes and ears are tested, and conditions of the teeth, heart, lungs, blood pressure, urine, hernia and varicose veins noted. Men found unsafe to run cars or trains are laid off, and given other work until in better condition. Cases found to be not immediately unfit, but not really good risks, are kept under observation and re-examined at intervals of a few months, and sometimes more often.

The following is a brief review of the results obtained in the 900 men examined during the past summer. The teeth head the list of defects.

Twenty-five per cent showed bad teeth, very many more poor teeth, and most of them showed almost complete neglect of the teeth.

Twenty-one per cent had varicose veins, but in no case were they causing disability.

Sixteen per cent had hernia, most of them wearing trusses.

Three per cent showed some disturbance of the lungs, i.e., bronchial, not tubercular.

Sugar was found in the urine in 2 per cent and albumin in 3 per cent.

Heart trouble was noted in 7½ per cent.

High blood pressure existed in 9 per cent., i.e., blood pressures with systolic readings of 180 or over. This percentage would be higher if the reading abnormal for each individual at his age was tabulated.

Of these hypertension cases, 23 per cent showed pathological heart conditions as well. Four per cent of them showed heart conditions and albumin, and 9 per cent showed albumin with no heart pathology.

In this group, then, we have a considerable number of cases where the high blood pressure is due to sclerotic changes in the arteries, the heart and the kidneys, and these cases will be kept under the most careful observation.

Many in this group, however, owe their hypertension to bad habits of eating and resultant overweight, to excessive use of tobacco, tea and coffee, and can readily be helped. Perhaps it is to this particular group that the yearly examination renders its greatest service, by the prevention of later chronic, incurable organic changes.

The hypertension group, while relatively small, is by its nature the most important. I will return to it later.

The next most important pathological condition is that of the teeth; it is by far the most prevalent condition, and is a factor in causing bad digestion, heart and arterial trouble and rheumatism.

But let us return now to the hypertension group, which furnish the greatest and most imminent threat to the safe operation of cars and trains. This class has become doubly important since so many of the older men, formerly conductors, have now become one-man car operators.

Two years ago we selected 76 men with systolic blood pressures ranging from 200 to 210, 230 and even 250, and with diastolics from 120 to 140. These men have been under treatment by their own doctors and have been tested by me personally at frequent intervals. In two years time, one-fourth or 25 per cent of these men have passed off the scene. Of these men no longer actively employed, 68 per cent have died and the others have been pensioned. In some cases, death was due to "shock" or "heart failure," but other causes, such as carbuncles, pneumonia, appendicitis, etc., were given as the cause.

Whatever the immediate cause, a group which loses 25 per cent of its personnel in two years time, offers a grave risk if employed in operating street railway cars or trains. It is simply a matter of chance whether some of these men die at the front end of a car in motion, or at home.

It is a difficult matter to lay down hard and fast rules about blood pressure limits. The whole picture, including the condition of the heart, kidneys and general health, must be considered. However, as a rough working standard, we have adopted certain arbitrary limits as a guide in these cases. No man with a diastolic pressure of 120 or more is permitted to operate a car or train, even if he seems sound in other respects, and no man with a systolic pressure of 200 or over, unless he has a diastolic pressure below 120, is permitted to operate a car or train. Men with lower readings but with bad heart action or other conditions, may be laid off also.

In determining the fitness of men with hypertension for work, we are laying greater stress on the diastolic than on the systolic pressure. The men who have died have been those with high diastolic readings, while we have a considerable number of men with high systolics and relatively low diastolics who are doing well. None of the high systolic with relatively low diastolic have died.

The cases removed from car or train operating are given other work and not returned to regular duty until their physical condition indicates that they are reasonably safe risks.

I believe that the yearly examination covering an age era when hypertension is to be expected, and a close following up of the cases found, offers us the best safeguard we have in dealing with men who operate street railway cars and trains.

Value and Uses of Medical Testimony*

In Preliminary Investigation, Company Physician's Report Is Sent for Approval or Comment to Attending Physician—In Court Proceedings Medical Testimony Should Be Given in Language Easily Understood by Laymen—Careful Preparation by Trial Attorneys Is Most Essential

By **H. Stuart MacLean, M.D.**
Chief Surgeon Virginia Electric & Power Company
Richmond, Va.

MEDICAL information is essential in the consideration of personal accident claims. This information is to be used under two conditions: In settlement of a claim by compromise or adjustment, and as testimony in trials.

In the first instance this information is of the greatest importance to the claim department, and it should be full, simply stated and given with due regard for probable or possible disagreement, of an honest character from the physician treating the claimant. The methods of obtaining this information vary with different companies, and as these variations are the outcome of long standing local customs it is not possible to adopt a universal plan for obtaining it. Some companies treat or see all injured parties promptly; others have medical investigation of injuries only as claims or other occasion arises, while still others pay no attention to the nature and extent of the injuries as a routine measure.

In outlining the procedure of the company which I represent, it is not intended to give the impression that we believe our system so much better than others. We have found it to work satisfactorily, showing at least an apparent interest in the injured party and in no small degree facilitating early and prompt settlements. We offer treatment to all injured parties, including hospital attention when necessary, provided they have not called or state that they do not want their own physician. Our doctor makes a prompt report of the nature and extent of the injuries together with a liberal estimate of the probable duration.

Cases treated by company physicians are carefully reported upon when discharged. Those treated by physicians of their own choice are checked by the preliminary report from the company's physician who called immediately after the accident. As the claim comes up for adjustment the name of the attending physician is obtained, also permission for the chief surgeon to call this physician and obtain a report as to the extent of the injuries. This is done promptly, a report of the conversation is written to the claim department and a copy of the report sent to the patient's physician. Accompanying this copy is a letter to the physician asking him to correct any errors or misquoting which may appear in the report.

H. S. MacLean, M.D.

This plan affords an opportunity for the chief surgeon to "iron out" any differences in diagnosis, prognosis or opinion which may appear between the information we have at hand and the opinion of the physician. By consistent fair dealing with attending physicians we have reached a point where we can almost always get a fair and conservative opinion from the physician and come to a surgical understanding upon which we both practically agree. The influence of this is considerable. In the event of liability it means that the attending physician agrees to physical injuries which the chief surgeon can approve. A report from the chief surgeon uncorrected by the physician means a tacit agreement in the salient points in the report, and if the claimant chooses to refer back to the attending physician the latter has the moral support of an opinion already given with the claimant's consent and will come pretty near "standing pat." The chief surgeon confers frequently with the claim department and interprets the medical reports as nearly as possible in terms of dollars and cents.

In the matter of medical testimony in suits for damages, a different view is held by the writer. The papers in the suit should, of course, include full and accurate information as to the nature and extent of the injury. This is an important factor in considering questions of compromise, and the information must therefore be as accurate as obtainable and in the last analysis should "lean" toward the plaintiff.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Claims Association, Cleveland, Ohio, Oct. 4-8, 1926.

MEDICAL TESTIMONY IN COURT PROCEEDINGS

The use of medical information in the court room comes under two heads: favorable and unfavorable statements from plaintiff's physicians.

The average jury is skeptical about medical testimony. The jurymen become listless or indifferent during immaterial medical testimony, particularly when given in the manner common with physicians, that is to say, testimony embellished with long, unintelligible words or statements given without reasonable effort to make them plain to a layman.

If a physician must be put on the stand, impress upon him the desirability of using "words of one syllable," and explaining or defining so that a layman can understand any technical terms for which he can find no fitting substitute. When we enter the trial of a contested case we have the statement of our own physicians and that of the attending physician as already outlined. If these two statements reasonably agree, we consider the medical phase settled. If the plaintiff's physician testifies along the lines of our advices on direct examination, he is thanked, complimented and released. One of the worst things that can be done is to cross-examine a reasonably satisfactory medical witness on some minor aspect of the case. Physicians on the witness stand, when cross-examined, are prone to imagine ulterior motives or veiled reflections upon their ability or judgment, and their reaction may result in some impulsive statement which will be damaging to the case or at least give rise to acrimonious, immaterial discussion. Under such conditions it takes a physician trained in court testimony and a suave lawyer to avoid making a bad impression upon a jury, and then the defendant usually gets the credit for causing it.

When the testimony of a plaintiff's physician is expected to be adverse and not in accordance with the facts as known to the defendant, it becomes necessary to combat him. When occasion arises, this should be done frankly, without any malice or feeling, and thoroughly.

The chief surgeon of the company, if a competent witness, should testify last in order to clear up any obscure points, make plain any technical information, and minimize any suggestion of personalities which may have arisen during the testimony of the other medical witnesses. The chief surgeon who cannot make plain any medical terms or conditions and who cannot abstain from all suggestions of personal feeling in his testimony is a poor man to put on the witness stand.

EXPERT TESTIMONY AS A LAST RESORT

As for experts, they are good things not to have to use. They should be a last resort, used only when you are convinced the claimant is flagrantly imposing or the claimant's physician is obviously wrong. When an expert is used, it often happens that the greatest value of his testimony is lost by reason of carelessness or insufficient preliminary discussion. He should be chosen not only for his general standing and peculiar knowledge of the matter in controversy, but because he is skilled in making the facts simple and plain. When a case is serious enough to need expert testimony, it is worthy of painstaking preliminary work. All the facts of the case, including any animosity or other unfavorable attitude of the plaintiff's physicians, should be placed before him. Then the questions which he will be asked in court should be considered and answers outlined. After this is done, a careful effort should be made to view the case from the plaintiff's angle and questions on that line asked in order to develop any weak point in the expert's opinion.

PROPER PREPARATION AND PRESENTATION MOST DESIRABLE

After 25 years experience in giving medical testimony I am forcibly impressed with the frequent lack of proper preparation and presentation of good, sound medical information in such trials. It seems that the following important facts are lost sight of: (1) The jurymen are anxious for plain, straightforward facts which they can readily grasp and apply to the issue. (2) Trial attorneys are too often possessed of only a superficial knowledge of medical facts in general (total ignorance would really serve them better), and they are unable to draw the facts from their own medical witnesses or successfully cross-question an opposing medical witness. (3) Physicians are sent to the stand when the attorneys have no foreknowledge of their testimony other than a brief report on the case or a sentence opinion expressed in a five-minute interview.

If medical testimony is to be used certain considerations should be observed.

1. The facts must be studied and arranged with a view to "getting them across to the jury." Don't give them any facts unless you are going to do it in a way they cannot fail to grasp and apply to the case. Be careful that you do not belittle any ailment testified about unless you can fully establish your contention. Some of the jury may have that very trouble.

2. A trial attorney should have a good working knowledge of the medical facts in a case and be prepared beforehand. A medical advisor seated by the side of an attorney may be helpful in suggesting certain questions at a trial, but it makes a deeper impression on both the jury and medical witnesses if such an adviser neither suggests questions nor is called upon for advice during cross-examination. All these points should be anticipated in preparation for the trial.

3. Spend too much, rather than too little, time learning what your medical witness intends to say may inadvertently say, or might be lead into saying by opposing counsel. In conference, do not take a medical witness' initial statement as final. Approach the point from different angles and with different qualifications. Physicians on the witness stand are prone to accept suggested qualifications or modifications in cleverly worded questions which are made to appear as contradictions and then the witness will become confused or offer a technical explanation. When this happens, "good night" jury.

Above all, make the testimony plain, make it simple, make it brief and make it in a kindly, considerate manner.

To summarize: Medical information is essential and very valuable in the adjustment of claims, and if properly obtained and used is an influential lever in effecting compromises up to the doors of the court room.

In the court room the less it is used, the better. When used it should be simple, direct and well planned in advance.

Accounting and Taxation of the Transportation Line*

Development of Electric Railway Practice from the Inception of the Accountants' Association in 1898 Is Sketched—Appointment of Committee to Act with the Congressional Committee on Internal Revenue Taxation Is Urged

By **Albert F. Elkins**
Manager Peat, Marwick, Mitchell & Company

A. F. ELKINS

WITHIN the brief span of 25 years the progress of the electric railroad, and especially the interurban, has been the marvel of the age. Towns, villages and hamlets have been linked together and production and distribution brought to the doors of our great cities of commerce and industry. Truly, the electric railway is an essential factor in our commercial life today, for without transportation facilities there would be no commerce. I have faith in the future of this industry, notwithstanding the recent development of the motor bus, and I predict that the electric railroad will increase and improve with the needs of commerce. We acclaimed the electric railway in the building, and although its natural growth has been hampered, and precautions which would have avoided many difficulties omitted, no modern community would welcome a return to the old order, or be content with limited transportation facilities.

It has been my privilege to witness the advancement of the accounting department of the electric railroad, which, in the old days, was looked upon as an unproductive and unnecessary adjunct of the business. However, the business executive soon displaced the old-time operator, and the transportation system entered the modern stage of business through the adoption in 1908 of a uniform classification of operating expenses, operating revenues and expenditures for road and equipment.

The first Street Railway Accountants' Association was organized at Cleveland, in March, 1897, and at that time the question of the adoption of a standard system of accounts was considered. At the second convention of the association, in 1898, a standard classification of operating expense accounts was adopted, which called for 39 such accounts in all. That classification, with some minor changes, remained the standard up to 1908.

The first classification was designed for use by street railways primarily, but with the advent of the interurban road it was considered desirable to have a classification which would meet the requirements of all classes of electric roads. Under the able leadership of W. F. Ham, chairman, the second classification was adopted at the Atlantic City convention in 1908. The Uniform System of Accounts for Electric Railways, prescribed by the Interstate Commerce Commission in 1914, superseded the tentative classification of Jan. 1, 1909, and is in effect at the present time. Like the classification for steam roads, prescribed by the commission at the same time, it has stood the test for twelve years, under rapidly changing conditions, and reflects the best thought not only of the accounting officers, but also the executive and operating officials, as well as the state commissions.

In the old days before public regulation, there was, as you know, practically no standard accounting system, and the auditor's position frequently depended on his ability to maintain pleasant relations with the operating department. The published balance sheet and profit and loss statement of the railroad were unknown quantities in those days, but that condition has changed and the confidence of the general public in our public service corporations has been strengthened. Much of the credit for this condition is due the auditor, who is required to keep his accounts in strict accordance with existing laws and regulations, and who is held responsible for results in this connection. Ability of the highest type is now required, and the successful auditor necessarily must remain true to conscientious standards under the most trying conditions.

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*Abstract of a paper presented at the annual convention of the American Electric Railway Accountants' Association, Cleveland, Ohio, Oct. 4-8, 1926.

The railroad differs from the ordinary industrial enterprise, in that it has but one product to sell, that of transportation, though it may be, and frequently is, engaged in other lines of activity. Its accounting system is prescribed by the Interstate Commerce Commission and the various state commissions, and uniformity is its keynote. While no system of accounting can be classified as perfect and as representing the last word in accounting detail, it is my opinion that public service accounting combines as nearly as possible all of the elements necessary to a complete system under existing laws and regulations.

The primary object in the mind of the railway accounting officer, of course, has always been to keep his accounts in such a way that the management might profit by this information, but the public nature of the enterprise has demanded publicity.

NEW TAXES REVOLUTIONIZED ACCOUNTING SYSTEM

We had only the corporation excise tax law in 1909, which was in effect an income tax, but we were beginning to forecast breakers ahead and lay our lines accordingly. Some of you may recall the so-called "Langdon tax law" of Ohio, a device for obtaining additional revenue, which necessitated a segregation of the accounts of railways as between state and interstate, in order correctly to apply the earnings. The Langdon law really presented the first accounting question of any importance so far as I know, until the enactment of the income tax law of 1913, following the constitutional amendment. This law imposed a tax of 1 per cent on corporations, and removed the $5,000 exemption provided for in the 1909 act.

There followed in quick succession the normal tax law of 1916, which was amended by the act of Oct. 3, 1917, and on the same date the war excess profits tax act was passed. This law, together with the war profits and excess profits tax law of 1918, actually revolutionized the accounting systems of corporations, and in order to meet the requirements of a statute that even experts had difficulty in interpreting, it became necessary to change accounting systems, radically in some instances, to reflect properly the true taxable income. Complexities multiplied, however, in the literal application of the statute to existing conditions, especially with respect to consolidated returns.

In those cases, especially among the railroads and public utility corporations, characterized by frequent changes in corporate ownership, accompanied with more or less complicated financial transactions, involved in organization or reorganization, the problem respecting the determination of invested capital became a real issue, magnified over and over again as other issues came to the front, such as affiliation, natural resources, good will, depreciation and amortization.

The revenue act of 1926, and regulations relating thereto, provide that when the taxpayer has had his "day in court" within the income tax unit, and the commissioner of internal revenue determines there is a deficiency in taxes, a notice of such deficiency is sent to the taxpayer by registered mail. Within 60 days after such notice is mailed the taxpayer may file a petition with the board of tax appeals for a redetermination of such deficiency. Except in those cases where the commissioner is authorized to make jeopardy assessments, the deficiency cannot be assessed within the 60-day period, nor, if the taxpayer has filed a petition with the board, before the decision of the board has become final.

Since the enactment of the sixteenth amendment to the Constitution, authorizing Congress to impose an income tax upon all incomes irrespective of the source from which derived, we have witnessed the enactment of several income tax laws, and with the expenses and obligations of the war, it is not unreasonable to believe that we will have this system of taxation with us for many years, graduated of course with the necessities and economies of the government. Secretary Mellon's argument that reduced rates of taxation would produce more revenue carries much weight in the light of results since the enactment of the revenue act of 1926, and a continuation of prosperous business as a whole will doubtless bring further tax reductions.

A very interesting feature of the revenue act of 1926 is the provision for a joint congressional committee on internal revenue taxation. This committee will, among other things, investigate measures and methods for the simplification of taxes, particularly the income tax. All of our tax laws have been more or less complicated, and every new act will contain many problemes of interpretation and application, but it is recognized that a simple system cannot be devised under present conditions. It is obvious that many difficulties will be encountered in the literal interpretation of the statutes, and I am quite sure this committee will welcome all constructive suggestions, especially from those who must bear the burden of taxation. To this end I recommend for your consideration the appointment of a special committee of this association to co-operate with the joint congressional committee, and suggest ways and means of not only tax simplification but a special form of return suitable for railways.

In closing I want to leave with you this thought: that the chief accounting officer of the railway occupies a more important position of trust than ever before, and that the public service corporation today more nearly approaches the ideal than at any time in American history. Today the progressive manager recognizes that the people have rights that should be respected, and he values the confidence of the people more than he does a franchise. It is up to you, therefore to maintain the highest standards of your profession, to the end that your company may merit the respect and confidence of the public you serve.

S. E. Emmons Misquoted

REMARKS of S. E. Emmons, assistant general manager of the United Railways & Electric Company of Baltimore, before the recent T. & T. meeting at Cleveland were misleading as reported in the Oct. 9 issue of the JOURNAL. On page 622, Mr. Emmons states that 30 new cars were added in Baltimore, which was erroneously reported 130.

The purpose of presenting these figures was to show that there had been a large retirement of the older type of cars, thereby effecting a large operating saving, while at the same time there had been an increase in service (seat-miles) more than meeting the increase in riding.

Retirement of single-truck equipment has been confined to those cars used with two men. Some single-truck cars are still used in one-man operation.

Building Company Esprit de Corps*

No Effective Public Relations Work Can Be Done Unless All Departments Function as a Team—The Purchasing and Storeroom Forces Are of Great Importance Due to Their Contacts

By **W. E. Wood**
Vice-President Virginia Electric & Power Company,
Richmond, Va.

W. E. Wood

PRIMARILY, employees are working for the success of their company and quite incidentally they are working for the success of their particular department. But whenever, in their desire to obtain departmental efficiency, their enthusiasm leads them to somewhat forget the rest of the company, the company's interest, the thing of prime importance, is not well served.

Happily, in a well synchronized organization, serving the company's interests and perfecting departmental efficiency do not conflict.

The perfect electric railway employee must measure up to the following requirements: (1) He must understand generally the policies and theory of operation of his company; (2) he must possess a detailed knowledge of that particular department with which he is connected; (3) he must earnestly desire to carry out the policies of his superiors; (4) he must stimulate a sincere co-operation between all departments.

Let us discuss briefly in order these four requisites of the perfect employee.

1. Every employee should understand generally the policies and theory on which the operation of his company is based. Unfortunately, far too often the general policies and theories of the company, as a whole, are not made known to the individuals of the purchasing department. And the point I want to emphasize is that in this event, regardless of the fact that the individuals of your department might be the most ingenious, efficient and scientific buyers, storers and distributors of supplies, yet your department, broadly speaking, cannot be rendering the most useful service to your company.

Does every employee thoroughly appreciate and understand that no street railway can continue to succeed unless it can obtain the confidence and good will of the public? If they do, they must recognize that their every contact with the public will have a bearing on the public's attitude toward their company. And, furthermore, if they do not have confidence in, respect for, and sincere good will toward their company and all its other departments, surely they cannot expect these things from the general public.

The only successful public relations department of any transportation company must be composed of the entire personnel of that company. Every member of each department has friends and acquaintances not connected with the company. Company and departmental affairs will almost unconsciously be discussed at times with these individuals. The tone of these discussions has an important bearing on the attitude of these individuals toward the company. If the employee does not understand and believe in the policies and theory of his company, it is obvious what harm is done. A department technically efficient cannot outweigh this harm.

2. Possess a detailed knowledge of that particular department with which he is connected. I need not discuss the necessity for this, as it is the object of the endeavors of your committee. We all know that a purchasing agent does not necessarily have to know how to wind an armature, nor an armature winder how to obtain quotations on armature coils, although both should understand that the company is obliged to render the best possible service at the very lowest consistent cost. Obviously to perform your part of the work, your department must know its part of the business. It is intricate and involved and requires constant thought and study. The saving you can effect by this knowledge can be so great as to reflect itself in our rate of fare, or enhance the possibility of being able to earn a fair return. Intelligence as regards our needs and promptness of delivery reflects itself in the perfection of the service we render.

3. Earnestly desire to carry out the policies and wishes of his superiors. This implies, of course, that the superior officers have plans in operation for keeping the employees informed as to these policies. Too

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*Abstract of a paper presented at the annual convention of the American Electric Railway Engineering Association, Cleveland, Ohio, Oct. 4-8, 1926.

often in the past this has not been the case. Where an employee does not know the policies of his company, especially as to the generalities of its daily operation, such as those pertaining to the development of public good will, the use of publicity, the handling of complaints, activity in civic affairs, service extension and expansion, he does not acquire that intimacy with his company which really makes him feel a part of it. The purchasing department employee, with his many contacts, has a wide field for service to his company by putting into practice, and giving expression to, its policies, which, in short, are the morals of the organization and need no further explanation.

4. Stimulate a sincere co-operation between all departments. Some call this *esprit de corps,* but Kipling came down to the level of the average man and gave it a human and understandable term, namely, "the everlasting teamwork of every bloomin' soul." There always is a strong tendency for each department to keep the teamwork within that department and to overlook the importance of synchronizing its work with that of the other departments. To illustrate: where a patron of the railway service meets with discourtesy or is passed up at the corner, the picture that comes to his mind is that of a company with a "don't-give-a-damn" policy. He imagines that the attitude of that one employee in that one department of the company is the spirit of the whole organization. It works the other way also. The impression made by a kind, courteous and "on-the-job" employee reflects favorably on the whole company and not on any particular department.

The purchasing department can be most helpful in the satisfactory operation of a transportation system both by assisting in its economic operation and by assisting the operating departments in doing good work and avoiding delays by keeping available well-balanced supplies of whatever they may want. You say the operating departments fail to foresee their requirements and insinuate responsibility for delays in your department. You will be best serving your company when your department is able to absorb such insinuations without resentment and counter-attack by winning their confidence and co-operation.

There can be no doubt that a well-devised rigid system is necessary for the best operation of your department, yet one with too little flexibility is frequently the cause of ill feeling on the part of the other departments and of those of the public with whom you have to deal. Any system to be devised must contain, as an essential element, what we will call an "understandingly sympathetic flexibility" which those of discernment can readily distinguish from "unwarranted or haphazard flexibility."

The merchants and supply men of any city are by nature interested in the purchasing departments. Do they and all of their employees have a respect for the efficiency, loyalty and fairness of the personnel of your department? Can we count on their unselfish co-operation, which has been induced by this respect of personnel? And are you and your employees so conversant with the company's affairs, needs and aims that you can convince them, who are invariably useful citizens, of the justness of the company's needs? What a wonderful help you can be towards the main objective of the company if by virtue of being in the purchasing and stores department you can contribute so greatly to the company's public good will and success.

Care in Ordering Is Essential[*]

By **Henry S. Day**
Manager Transportation Division, Westinghouse
Electric & Manufacturing Company,
Boston, Mass.

HENRY S. DAY

Failure to List Complete Catalog Data in Placing Orders for Parts or Materials Wastes Both Time and Money—Obsolete Catalogs Should Be Destroyed

IT IS a fairly safe statement to make that almost the first inquiry that comes up between the salesman and the purchaser in the average negotiation is, "What is your best delivery?" and very frequently the success of the sale depends on how quick the purchase can be delivered.

If the product being purchased is a stock item, there is no good reason why the interval of time between the closing of the sale and the delivery should be great if the necessary paper work is properly executed, first by the purchaser, and second by the manufacturer.

The same applies to non-stock or special items, with the difference that parts or material that must be manufactured after receipt of the order require more time, and the actual order passes through many more hands.

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[*] Abstract of a paper presented at the annual convention of the American Electric Railway Engineering Association, Cleveland, Ohio, Oct. 4-8, 1926.

It is, of course, assumed that the manufacturer carries a good stock of standard parts and material, and is equipped to manufacture and ship non-stock and special items just as soon as he knows accurately exactly what the purchaser wants, but until the order, correctly written, reaches the warehouse or shop, production or shipment cannot proceed.

Naturally, there are many orders that meet with delay, for which incorrect preparation is not responsible, but there are too many where the delivery would satisfactorily meet requirements if someone along the line had not made an error. With the necessarily complex organization of the average purchaser and manufacturer the path the order follows is long and involves many individuals, and a small mistake in paper work is very often responsible for long and costly delays.

Manufacturers expend large sums each year in trying to supply accurate and up-to-date ordering information, and are constantly issuing new and revised catalogs and descriptive matter. When these are carefully followed, an order is quickly and easily interpreted and generally gets through without unnecessary loss of time. Manufacturers also spend much time and money in the organization of an order department, whose business it is not only to receive and enter orders, but to check all information for possible errors.

When it is considered that a large manufacturer handles a great diversity of parts and material that run into many thousands numerically, it can be readily understood that too much care cannot be exercised at the first point in the line in seeing that the proper catalog is used and that the correct description, type and catalog designation—whether it be style or catalog number—is given. Mistakes that result in delays are usually easily avoided and, therefore, unnecessary. The wrong type used or the type omitted, transposition or omission of digits in style or catalog numbers, and lack of full and complete description—all of these are essential. Probably more orders go wrong when ordering parts for apparatus than when ordering material.

In ordering parts, the type of the apparatus the part is to be used with, the style or catalog number, and the complete catalog description are all equally essential because types change and styles or catalogs are superseded. If, in writing up the order, one of these three has been given incorrectly, the other two will furnish enough information for reference and check in a catalog, and generally result in the customer's order being corrected at the time of receipt. On the other hand, if one of the three is omitted and there is a mistake in either of the other two, the case is generally hopeless, and the order stands still until the customer can be reached and the item checked.

Very often orders are received that from their wording indicate that the purchaser may be rather uncertain as to exactly what he wants, but feels that the manufacturer's order clerks are familiar enough with the apparatus for which the part is required, to correctly interpret the order, and therefore allows it to come through in a more or less incomplete state. As a matter of fact, the order department of a large manufacturer is handling many thousands of orders each month, and the clerical force of which the order department is composed is very likely not to be any more familiar with the technical terms and designations than is the purchaser's order department.

There is no hard and fast rule for eliminating errors in ordering that will meet all circumstances, but some of the very essential points to bear in mind are to:

Always use catalog specifications, drawing numbers and complete description when available.

Destroy all old catalogs as soon as new and later or revised copies are received. When catalogs, drawings or specifications are not available, give nameplate data in full, with a complete description of parts required, dimensions, what it is for and how it functions, and when practical send a sample.

Keep catalogs up to date, but keep all old catalogs which have not been superseded, for obsolete equipment which may be in service, as old catalogs may be out of print and difficult to obtain.

Regarding the last, it is unquestionably the manufacturer's job to keep the purchaser fully supplied with the latest ordering information and it is certainly to his interest to do so. On the other hand, if he fails, as he sometimes does, it is just as much to the interest of the purchaser to obtain and use the proper catalogs, as his interests are directly served by any reduction in time of delivery of orders.

The average catalog is so arranged as to make ordering information easily accessible and plainly interpreted, but it not infrequently occurs among mechanics and operators that there is a reluctance on their part to use catalogs correctly. Here again it is to the manufacturer's interest to see that those in the purchaser's organization who are responsible for the ordering of material, even though indirectly, are not only thoroughly supplied with catalogs, but are thoroughly posted in their use. If again the manufacturer's representatives fail, a little attention by the purchaser to the men in his own organization along these lines will produce far-reaching results.

Manufacturers are coming more and more to unit quantity packages and, particularly in small items, shipments will usually be made more quickly and with less liability of error if ordered in this manner.

Prompt shipment of orders received, without error is a subject that is foremost before the manufacturer, and always will be and, to a considerable extent, the degree of success attained will be the measuring stick used to gage his service to his customer. The cause for the many mistakes and delays lies on both sides, but by close attention to details and hearty co-operation, a great deal of time—and therefore money—can be saved.

MANUFACTURERS expend large sums each year in trying to supply accurate and up-to-date ordering information, and are constantly issuing new and revised catalogs and descriptive matter. When these are carefully followed, an order is quickly and easily interpreted and generally gets through without unnecessary loss of time. Manufacturers also spend much time and money in the organization of an order department, whose business it is not only to receive and enter orders but to check all information for possible errors.

Traffic Congestion

The Fundamental Approach[*]

Traffic Problems Becoming Rapidly More Acute with Growth of Cities—Selective Transportation the Nearest Approach to an Answer—Speed Restrictions, Street Signal Control, Parking and Day Storage Problems Considered

***By* J. Rowland Bibbins**
Transportation Engineer, Washington, D. C.

THE so-called "traffic problem," formerly everybody's business, is now graduated to a higher plane of engineering analysis and transportation practice, where it always belonged. This is the place assigned to it by the committee on metropolitan development in the Washington Conference report. The time for unskilled experiment has passed and that for technical leadership, much of it embraced in this association, has arrived.

Population density lies at the bottom of our trouble. The drift to our cities is a matter of concern. In 1890, 35 per cent was urban, in 1900, 40 per cent; 1910, 46 per cent, and 1920, 51 per cent. During the last census decade our cities grew half as much as in their entire history up to 1890. While million class cities are slowing down, unfortunately the half-million near-big cities are accelerating. They are catching the fever of greatness but not adequately planning ahead for it. By 1950 the physical problem of transportation and traffic will at least double in magnitude. One large city doubled in population in five years, four in seven years, 228 in 30 years.

Metropolitan economic growth also follows mathematical laws. When city population doubles, land value, the basis of all taxation, revenue and public works, trebles or quadruples; city passenger transport, rail and rubber, probably quadruples; railroad tonnage increases nearly seven times, passenger traffic about eight times, or as the cube of the population; Detroit building permits and high building floorage nearly as the cube. These rates, however, pale into insignificance in comparison with automobile registration, which increased as the twentieth power of the population, 1905 to 1920, perceptibly declining thereafter in rate, though not in total.

Our urban dwellers own nearly over 70 per cent of the nation's motor cars. The approach of so-called "saturation," so widely heralded, has become a delusion. My estimate of 30,000,000 motors, made two years ago on the basis of the California unit density of one motor per family for the whole United States in 1940, it appears from present indications, will be exceeded. This city registration doubled within four years and with about the same rate in both large and small cities.

There is only one escape from this traffic concentration, with its appalling problems of capital expenditures for transportation, traffic facilities and thoroughfares; that is decentralization, both for the city and the nation. Until downtown business men stop building skyward, city budgets will grow with appalling speed. In spite of billions invested in rapid transit, street and sidewalk capacity has become the acute problem, which finds no solution where half a city's working population is dumped into the mile circle each day. Peak-load factors, both in transportation and traffic, are the crucial economic points in service and investment.

Selective transportation seems to be our nearest approach to an answer: (1) De luxe bus, long haul; (2) local and transfer bus, short haul; (3) street railways, long and short haul; (4) subways, elevated and suburban railroad, long haul; (5) taxicabs and private autos. This system, with its differential fares and differential speeds, will alone meet the need of our expanding metropolises, with a real and practical zone system not otherwise obtainable. The 30-minute time zone seems to define generally our transportation necessities and calls for express streets, buses and rails, as the basic requirement to secure the increased scheduled speed we so greatly need. We have now imported from European practice the limited "Car Full" regulation in bus operation, hitherto an impossibility in America. This means that the railways alone must still be relied upon to meet the balance of the peak-load demands of mass transportation in large centers. Until we change our habits of travel and of business by staggered hours mass transportation must stay on rails.

Capital investment in city highways and paving, so large a proportion of the traffic problem, seems to receive little consideration. The average in 290 cities is nearly 1,000 miles per million inhabitants, four cities ranging from 1,100 to 2,000 miles. The present shifting from rail to rubber of both passenger and freight movement emphasizes this great problem of 60,000,000 inhabitants, 60,000 miles of pavement and $3,000,000,000-odd investment. No one knows yet how to distribute the huge maintenance cost between public and private carrier, but it must be apparent that as the paving budgets grow local transportation will automatically be called upon for a larger share, which must be reflected in the fare, and in the end bring about the thing we want, decentralization.

City debt limit and taxation are the final factors limiting traffic and transportation development. With basic land values increasing only as the square of the population or less and city construction budgets as the cube, as in New York, some one must make up the difference. The Detroit debt limit is now increasing over the fourth power of the population, likewise Chicago. Private contributions to city building may hardly be expected. The next step is local district benefit assessment. Already advocated for rapid transit, it is now talked of for traffic and city improvements also. The principle is right, applying a little of the unearned increment to offset the greater benefit derived from these improvements, although it means more capital load upon the land, higher cost of doing business at the center, but in the end, decentralization. The same principle has got to be applied in allocating traffic improvement costs as between city, county and state.

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[*] Abstract of a discussion before the annual convention of the American Electric Railway Transportation & Traffic Association, Cleveland, Ohio, Oct. 4-8, 1926.

Car routing improvements are needed in many cities and would seem to be one of the best ways to meet private automobile competition, along with improved service and running time. In a city of 350,000 inhabitants I found automobiles to be carrying practically as many people in and out of the central district as street cars, even during the maximum rush period, largely due to a fixed loop terminal system of routing, pay transfers at the center, and lack of logical through routes and adequate by-pass traffic routes. In another city of 500,000 autos carried 60 per cent more people than street cars into the 2-mile circle. Loop car mileage runs into astonishing high figures, and in one important case I found loop time to be more than the running time of the average passenger to his rush-hour home destination.

Transportation lies at the bottom. It has always seemed to me that in so-called "planning," both city and traffic, the planning has been entirely too sketchy and indefinite. We must think in terms of city building, not planning; traffic program, not ordinances; transportation, not individual or corporate facilities. This clearly requires unification to develop street and track capacity for both passenger and freight traffic, however carried. To grant multitudinous franchises today is repeating the economic fallacy of multiple franchises it has taken 30 years to eradicate in transit. It is a hopeful tendency that the "unification for profit" in the past is being replaced by "unification for service."

Finally, a few definite comments on the traffic conference report:

1. Traffic speed restrictions are too low. With street cars geared to 20 to 25 m.p.h. maximum speed and usually reaching 18 or more, I see no reason why traffic should not be encouraged to keep ahead of and out of the way of street cars rather than trail them, so as to use up the clear headway spacing ahead. Street cars and buses should have the right of way at crossings over traffic, and traffic over pedestrians. Running through or over safety zones is a moot point. Detroit permits it, Washington does not. I see no logic in pre-empting four out of six lanes of a roadway on a five-minute headway car line street. Perhaps a good compromise would be to divert traffic by arrows around the station under one-minute headways and everywhere during rush hours.

2. More efficient signal control must be worked out—by engineers rather than by policemen. The fixed synchronous block signal is poorly adapted indeed to transit or speed traffic. In Philadelphia this added from 1½ to two minutes running time per trip to all cars in the downtown delivery district on Walnut and Chestnut Streets, already running 22 seconds headway. My analysis in Lancaster indicates manual control handled traffic with 50 per cent greater efficiency. The use of this "stop and run" signal on heavy traffic clearing streets, especially retail streets, is exceedingly dubious. The progressive synchronous or speed control is plainly the best system for heavy traffic arteries with the shortest possible time interval. This interval is extremely important and on street car trunks should be adjusted primarily from the typical speed-time curve and varied throughout the day according to traffic pressure as nearly for individual crossings as possible. Even with this system, manual sub-control will probably be necessary to clear traffic jams.

3. The parking problem has not been approached fairly. There is no economic logic in the prevailing lack of enforcement of existing regulations. Moderate regulations enforced should produce far better results. This requires a selected and technically trained patrol with the aid of the general police also instructed for emergencies. My surveys indicate an average parking time in the central district around 30 minutes and well within the hour. This emphasizes the wisdom and practicability of graded parking time, properly enforced, and this time should gradually be reduced until sufficient parking gaps along the curb are provided for convenient loading and unloading.

4. Day storage is imperative. I believe it fair, in the case of such a national family utility as the automobile, to see that day storage is provided, either by private or public means, before rigid exclusion laws and regulations are passed. Low monthly rates are the key to success if off-street garaging is to become of any importance. It may have to become a city cost-of-service enterprise. Nothing is heard in traffic discussions of commercial vehicles as a congestion factor except double parking. Yet I have found them responsible for half as much traffic as private automobiles downtown, and at many important intersection districts as much as 100 per cent.

In conclusion, the recommendations of the traffic conference report will clearly have to be modified to suit local needs in many particulars, but it is a start, and, in my judgment, the contribution of the Metropolitan Traffic Development Committee, though small in volume, is outstanding in principle. "Traffic," so called, is not the major factor. The real problem is transportation, economics, engineering and horse sense.

> **WE must think in terms of city building, not planning; traffic program, not ordinances; transportation, not individual or corporate facilities. This clearly requires unification to develop street and track capacity for both passenger and freight traffic, however carried. To grant multitudinous franchises today is repeating the economic fallacy of multiple franchises it has taken 30 years to eradicate in transit.**
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> **—J. ROWLAND BIBBINS.**

Accountants' Committees Standardize Practice

Fare Collections, Standard Classification of Accounts, Bus Accounting and a Review of the Work of the Association Since Its Formation Are Subjects Treated During the Year Just Closed

FROM its inception the activity of the Accountants' Association has centered in the standard classification of accounts. The work of this committee has been augmented for the past two years by that of the committee on bus accounting. The latter committee presented a complete classification of accounts for bus operators last year, and this year made a condensed classification for those companies having such small revenues that the greater subdivision is not justified. These and other committee reports are abstracted below.

JOHN J. DUCK
President Accountants' Association, 1925-1926

Fare Collections

OF MANY new problems of fare collection the two most important developments are one-man operation, and the motor coach or bus.

One-man operation undoubtedly presents the greater problems. This presents serious difficulty to the system that has a multiple coin fare, but where a single coin or token is, or can be made the medium of payment, the saving in expense which the one-man car offers is worthy of most earnest consideration. In a general way fare collection methods on buses need not differ greatly from those used on one-man street cars.

E. A. TUSON
Chairman

The following propositions are submitted for fare collection on street cars and buses operated by one man.

1. *Single Zone Lines, Street Cars and Buses.*—Pay-enter. In the case of automatic registering fare boxes a separate overhead register should be provided for the registration of tickets and other paper. When non-automatic boxes are used an overhead register should be provided for the registering of all fares.

2. *Two-Zone Lines, Street Cars and Buses.*—Zone 1—Pay-enter. Zone 2—Pay-leave. Registration as for one-zone lines.

3. *Three-Zone Lines — Street Cars and Buses.*—Zone 1—Pay-enter. Zone 2—Pay-leave. Zone 3—Pay-enter with identification check—pay-leave. Registration as for one-zone lines.

4a. *Line of Four or More Zones—Street Cars Only.*—Zone 1—Pay-enter. Zone 2—Pay-leave. Inside collection. Zone 3—Pay-enter. Zone 4—Pay-leave. Registration as for one-zone lines, but in addition thereto a register should be provided for inside collections. At the end of Zone 2, an inspector boards, counts the load, and then operates the car while the regular operator goes through to collect two fares from each passenger, registering these on the inside collection register. This done, the inspector verifies the registration from his count and leaves the car. The operator continues through Zones 3 and 4 on pay-enter and pay-leave respectively and, where the line is more than four zones long, the inside collection is repeated at the end of Zone 4, and so on to the end of the line. Where desirable, the operator may perform the inside collection, holding the car at the zone point.

4b. *Line of Four or More Zones—Buses.*—Zone 1—Pay-enter. Zone 2—Pay-leave. Zone 3 and all succeeding zones — pay-enter with identification check—pay-leave. Registration as for one-zone lines. On very long lines, the non-automatic box is perhaps preferable, because of its capacity to take coins of larger denomination. In zone 3, and succeeding zones, each passenger boarding pays one fare as he enters and receives an identification check which establishes his point of origin and which he holds until he leaves. There are several elements of safety and convenience which make this scheme preferable for buses to that outlined for street cars under 4a.

The recommendations offered under items 1, 2 and 3 above are felt to be entirely satisfactory and workable under practically all conditions of operation. Plan 4a is also reasonably satisfactory except in its application to lines of two or more zones operating on a half-hour headway or longer, where its interference with running time might be a factor. Plan 4b is the least satisfactory of all in that it does comparatively little toward abolishing the ever-troublesome paper.

As alternative to these latter two plans may be suggested the use of the overhead classified register which handles the problem in a fairly satisfactory manner, especially where there is a complicated ticket situation, but there is now under development by at least two of our prominent manufacturers what is, in effect, a fare cash register, which issues a ticket showing thereon the points of origin and destination, the date of issue, the kind of fare paid, whether cash or ticket, and the amount paid, these amounts being accumulated in a totalizing register. The success of this machine may solve our difficulties under plans 4a and 4b.

In conclusion the committee emphasized the great value of one-man operation in net earnings. Its success is a vital thing to many companies. To insure this success, the operator must be given all the help possible in the way of simplified fare collection, reduction of manual and clerical duties, in which the automatic registering fare box greatly assists, and the elimination of paper tickets wherever possible.

These fare collection methods were recommended to those whose enthusiasm for conversion to one-man operation has been tempered by fears on the score of proper handling and protection of revenue.

The report was signed by J. D. Evans, A. G. Neal, W. G. Nicholson and E. A. Tuson, chairman.

Committee to Review the Proceedings of the Accountants' Association

COMPARATIVELY small individual membership in the Accountants' Association at the present time is believed to be caused by a lack of information as to benefits to be gained by such membership rather than a lack of interest. The records are eloquent in this respect. The high point in membership seems to have been reached in 1907 with 246 members. The individual members at present number 65.

J. E. HEBERLE
Chairman

The committee recommends that a membership committee be appointed to bring into the Accountants' Association as individual members representatives from all companies affiliated with the parent association and believes that successful achievement of this committee's function will greatly stimulate interest in the Accountants' Association work and will result in corresponding benefits to member companies.

It was the sense of the committee that the subject of fixed capital records has not been given the attention this important matter deserves, and should be made the object of committee study.

The committee believed that one of the most important questions affecting the industry at large at the present time is that of bus accounting, in its broader aspects, and urged that careful study be given to the accounting features involved in the co-relation of bus operations with street railway operations in the general field of our industry—that of furnishing transportation. It was also recommended that a committee be formed to study and report on the subject of bus depreciation, including the basis and methods and the experiences of member companies.

The subject of forms for condensed operating reports, with operating statistics, and the use of graphs in connection therewith, is one that might be usefully developed.

It was suggested that the best methods to be followed in ascertaining and recording the cost of projects or units or property should be the subject of study, and that such a study might well be combined with that of the application of cost accounting to our industry.

It was urged that measures be taken to stimulate interest in the association magazine, *Area* and in the accountants' section of the "Question Box."

The committee incorporated in its report the following quotation from the address of President Budd at the 1924 convention:

"The accountant in addition to all his multitude of work in the handling of figures, reports, etc., also is the officer, more than any other, who safeguards the business principles and the business methods; that should be his function and it shouldn't stop merely at the compilation of figures. He should be the officer who is the warning signal for slipshod, wasteful, inefficient or unbusinesslike practices. Therefore, the accountant and accounting officers exert a very great influence on an organization.

"Also, the accountant in later years has become more and more of an important factor in connection with our valuation and rates and the compilation of figures and the analysis of them. The statistical information that is now absolutely essential to any executive in order to get correct information is almost a profession in itself, not only to compile these statistics, but to analyze them and show what they mean and what tendencies they disclose."

The report was signed by O. H. Bernd, F. J. Gannon, L. A. Lovell, and J. E. Heberle, chairman.

Standard Classification of Accounts

DURING the past year the committee has received several inquiries relative to interpretations of the classification of accounts and has handled these requests by correspondence.

At the request of Alexander Wylie, director bureau of accounts, Interstate Commerce Commission, the committee held a meeting in Washington, D. C., in connection with the proposed revision of the classification of accounts for electric railways and will keep in close touch with the bureau in connection with this subject.

During the past year W. F. Ham, a member of the classification committee since the organization of the Accountants' Association in 1897, resigned from the committee on account of the press of other duties and I. A. May, comptroller of the Connecticut Company, New Haven, Conn., was appointed to fill the vacancy.

The report was signed by I. A. May, C. S. Mitchell, H. L. Wilson, P. S. Young and M. W. Glover, chairman.

Bus Accounting

THE classification of bus accounts presented by the committee at the 1925 convention was adopted by the association with certain amendments. These amendments were incorporated in the classification, and the association published the classification as amended.

During the year several questions relating to interpretations of the classification were presented to the committee by companies, and replies to these questions were given by the committee.

The committee received many calls for a condensed classification from companies whose revenues amounted to less than $100,000 per year, and issued in May, 1926, a condensed classification of accounts suitable for such companies.

The condensed classification, as published in May, 1926, was presented to the association for adoption. The committee suggests that if any changes in the classification of bus accounts are considered desirable, that such changes be referred to the committee for investigation and consideration, the committee to report back to the association with recommendations as to the desirability of the proposed changes.

M. W. GLOVER
Chairman

The committee has been unable to get a complete list of all companies which have adopted the classification, but it appears to have been found satisfactory both for the use of independent companies as well as for electric railways operating motor buses in connection with other rail operations. The classification was devised with this end in view and no difficulty has been experienced in subdividing the classification of accounts prescribed for electric railways to include motor bus operations as a subdivision of the accounts affected.

The classification is now being used in the District of Columbia, and in the states of West Virginia, Connecticut, New Jersey, Pennsylvania, New York and Ohio, and possibly in other states, which have so far not issued an official classification for motor bus operations.

The report was signed by P. R. Jacques, H. C. Kimball, C. R. Mahan, C. W. Stocks, N. E. Stubbs, E. A. Tuson and M. W. Glover, chairman.

Maintenance Notes

High-Pressure Water for Truck Cleaning

WATER at high pressure is used in the Cleveland Railway shop to clean trucks before going to the paint shop, as it easily removes accumulated mud and grease with surprising ease. The pressure is obtained by use of a portable motor-driven pump. The equipment, manufactured by the Ralph L. Fuller Associates, Cleveland, Ohio, is mounted on a portable truck that may be moved to any position. As shown, permanent connections are run to several overhead points that supply water and electricity for the equipment, thus avoiding the need for long lengths of either hose or conductor cable.

High Pressure Water Is Used to Clean Trucks in Cleveland. Ralph W. Emerson, General Manager of the Cleveland Railway, Is Illustrating the Use of This Equipment

Emergency Calls Greatest Between 9 A.M. and 5 P.M.

By G. H. McKelway

Engineer of Distribution, Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

ONCE it was the custom on a certain electric railway to work the same number of emergency line crews at night as during the day. As the crews were used for little aside from emergency service, and as the number of calls received during the night was much less than during the day, the night crews had a much easier time of it than those that were working during the day.

Any dissatisfaction of the men was avoided by having the crews change shifts every two weeks, but the company executives were not satisfied because it was evident that the night men were, as a rule, doing much less than they could do and that some of them might be taken off of emergency duty and put on other work.

In order to find out just how the calls were coming in and to learn what crews could be spared best, the records of the preceding year were gone over in detail, and the average number of calls each hour of the day received by each crew, and in each month of the year was found.

After studying the results carefully, it was decided that one-third of the night crews could be done away with without danger to the service, so this cut was made.

RELATIVE NUMBERS OF EMERGENCY LINE CALLS BY HOURS AVERAGED FOR A YEAR

A.M. Hour	Per Cent of Total Calls	P.M. Hour	Per Cent of Calls
12-1	0.91	12-1	5.88
1-2	1.09	1-2	5.04
2-3	0.57	2-3	7.40
3-4	0.61	3-4	8.96
4-5	0.81	4-5	7.93
5-6	2.01	5-6	4.02
6-7	2.97	6-7	4.26
7-8	3.20	7-8	4.58
8-9	5.36	8-9	2.57
9-10	9.30	9-10	2.19
10-11	8.96	10-11	1.21
11-12	8.64	11-12	1.53

The detailed figures would not apply to other systems but the average per cent of the total calls on the system, as received each hour, should be interesting, and they were found to be as shown in the table.

During the year that was analyzed as given above, the calls to the emergency crews on this system, for all purposes, averaged approximately 1,000 per month.

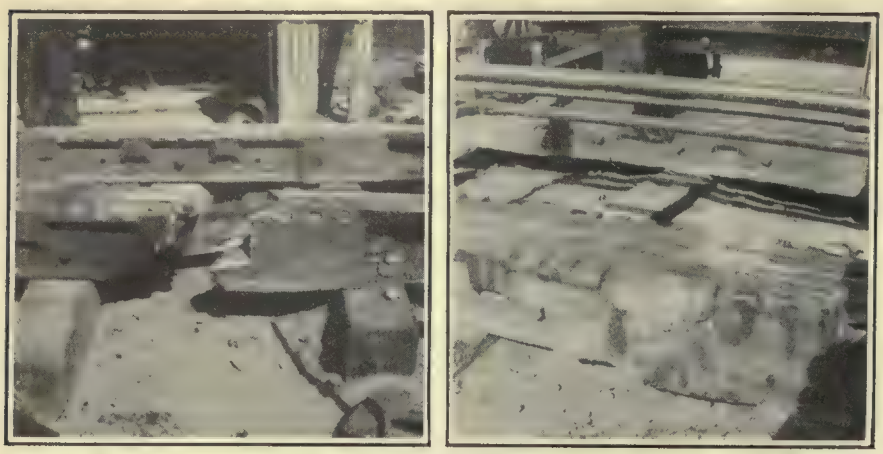
Time Basis Used for Inspection of Los Angeles Cars

IMPROVED appearance of cars and equipment and the reduction of noise to a minimum have been stressed particularly in the maintenance of cars operated by the Los Angeles Railway, Los Angeles, Cal. This company is very exacting in its requirements as to the mechanical perfection of the equipment. Each car in regular service is given a safety inspection every night. This includes the inspection of brake shoes, brake rigging, wheel flanges, gear cases and truck bolts. Each car is also swept and dusted every night. Cars that are used for morning tripper service and are due for regular inspection during the day are cleaned during the daytime and are washed when necessary.

The regular inspection of cars is divided into three classes, A, B and C, which differ in the amount of detail work done. Cars with "K" type control are given the A inspection every 80 hours, the B inspection every 960 hours and the C inspection every 1,920 hours. Cars with multiple-unit type control are given the A inspection every 120 hours, the B inspection every 960 hours and the C inspection every 1,920 hours. All cars are sent to the shop for a general overhauling every eighteen months.

Switch and Mate Rebuilt by Welding

THERMIT welding was recently used with entire success by the Union Street Railway, New Bedford, Mass., to rebuild a track switch and mate that had broken apart from their original castings. Upon ex-



At Left, Broken Mate Casting Before Welding. At Right, Same Casting After Welding

amination it was found that the switch and mate were in excellent condition, but the castings were broken. It was thought that if these were recast they would probably render good service for some time to come.

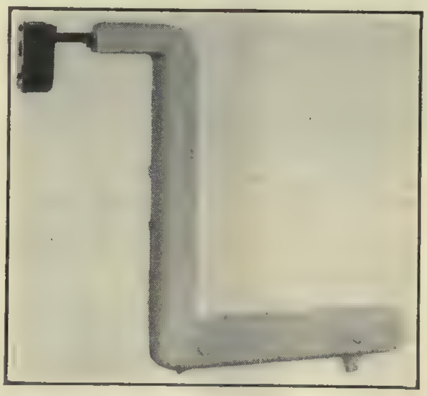
The pieces were taken out of their positions and brought to the side of the road, where they were relined and thermit welded. After being replaced they were surfaced with an electric grinder. It is the belief of the company that they will give several more years of satisfactory service. The cost of the work was about 25 per cent less than the cost of new pieces of trackwork.

New Equipment Available

Larger Metal Melting Pot Is Developed

A NEW metal melting pot, with a capacity of approximately 1,000 lb., has been added to the General Electric line and is now on the market. This pot, utilizing the electric heating principle, is practically the same as other standard General Electric melting pots except that three cast-in, sheath-wire immersion heating units are used instead of two.

This Metal Melting Pot Has a Capacity of 1,000 Lb.



Heating Unit Used with the New Melting Pot

Each heating unit is rated at 5 kw. The pot may be operated either on 110 or 220-volt a.c. or d.c. circuits and the use of three heating units will also permit balanced three-phase operation.

The pot itself consists of a sheet steel cylindrical casing in which is supported a cast-iron crucible of the following dimensions: inside, 18 in. diameter and 15 in. depth; outside, 29 in. diameter and 31 in. depth. The space between the casing and the crucible, measuring about 3 in., is efficiently insulated with a compact heat insulator. The leads of the heating units are brought over the top of the pot into a connection box fixed to the unit itself.

Melting pots of this type are designed for melting lead, babbitt, tin, solder and similar alloys or metals, except spelter or zinc, at temperatures not exceeding 850 deg.

Full-automatic control is recommended, consisting of a standard automatic control panel and a temperature control instrument equipped with a special bulb for metal immersion. Separate heating units may be installed in existing installations of melting pots where dimensions permit and where temperatures do not exceed 850 deg. F.

Combined Heating and Ventilating System

HEATING and ventilating of buses are combined in a system announced by the Consolidated Car Heating Company Albany, N. Y. This has been developed in conjunction with Thompson Research, Inc., Cleveland, Ohio. New features include provision not only for heating and ventilating buses mechanically by the use of a blower but also for removing all odor and poisons from the exhaust gases. The system comprises an air intake communicating with the exhaust pipe from the engine, an air mixing chamber in which the exhaust gases are automatically mixed with the proper proportion of outside air to form an ignitable mixture, and a combustion chamber in which this mixture is ignited and burned, the latter serving as a most effective muffler.

Surrounding the exhaust pipe leading from the combustion chamber is a heat-insulated housing or air heater which communicates by means of a sheet metal duct with the front and also with the rear of the bus body. A blower mechanically driven by the engine forces air through this heater into the front of the bus. The air supplied to the heater may be taken either from the inside of the bus at the rear or from the outside, as desired. By means of dampers operated from the dashboard outside air can be mixed in various proportions with the air from the bus, or the entire supply can be taken from the outside. When no heat is needed air is drawn from the bus through the heater and discharged to the atmosphere.

The system is extremely flexible and is said to provide ample heating and ventilating capacity for the most severe weather, or it may be used entirely for ventilating purposes. The burning of the exhaust gas mixed with air in the combustion chamber results not only in the complete elimination of all odors and poisonous gases from the exhaust, but also generates an immense amount of heat, which is utilized in the air heater. In designing the equipment it has been the aim to keep the exhaust outside the bus body at all times and to destroy the odor and poisons in it before utilizing it as a source of heat. The air within the bus is therefore clean, pure and odorless, as are the gases discharged from the exhaust pipe.

Truck Dumps at Either Side or Rear

DESIGNED particularly to meet electric railway needs, the Differential Steel Car Company, Findlay, Ohio, has just brought out a new dumping body for motor trucks. An outstanding feature of this new dumping body is its arrangement so that it can dump to either side or to the rear. In electric railway track construction it is frequently of particular importance to deposit material in the track area. The side-dumping feature meets this condition. When depositing material in a trench or at the dump, time and labor are saved by driving alongside of the excavated area and then depositing the load where required. The end dumping feature is of advantage in working on crowded streets where material must be deposited alongside the work.

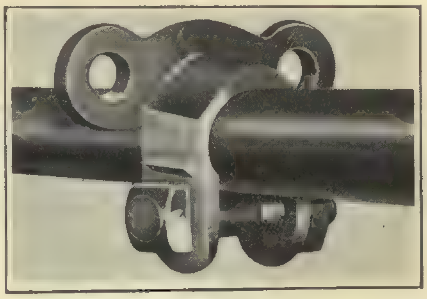
The body is constructed entirely of steel and is designed to give great strength without excessive weight. The side doors are hinged at the bottom and in dumping the door of the low side automatically pulls down into the same plane as the floor. The door on the other side remains closed. This arrangement gives a clear opening so that material of any size may be dumped and the door forms an extension to the floor, which deposits the load clear of the roadway so as not to interfere with the movement of the truck itself. A simple system of levers governs the opening and closing of the doors automatically.

The hoist consists of a telescoping screw which is driven by a set of bevel gears. When this screw is driven in a clockwise direction it extends itself, thereby imparting the motion to the body for dumping. At both top and bottom of this screw are ball and socket joints which allow for extreme flexibility.

Angle Cock Holder and Pipe Clamp

FOR the purpose of holding angle cocks securely in their proper position, Mudge & Company, Chicago, Ill., have just placed a new pipe clamp and angle cock holder on the market. It is made of forged steel. The angle cock holder can be used with any shape of steel bracket which the construction of the car requires. No special keys or forgings are needed as the ordinary bolts produce a clamping effect.

The manufacturer states that ample bearing surface on the bolts and clamps secures positive anchorage of the brake pipe and prevents vibration and longitudinal movement. The projecting lip on the angle cock holder fits over the hex on the angle cock and prevents the latter from turning or becoming disordered.

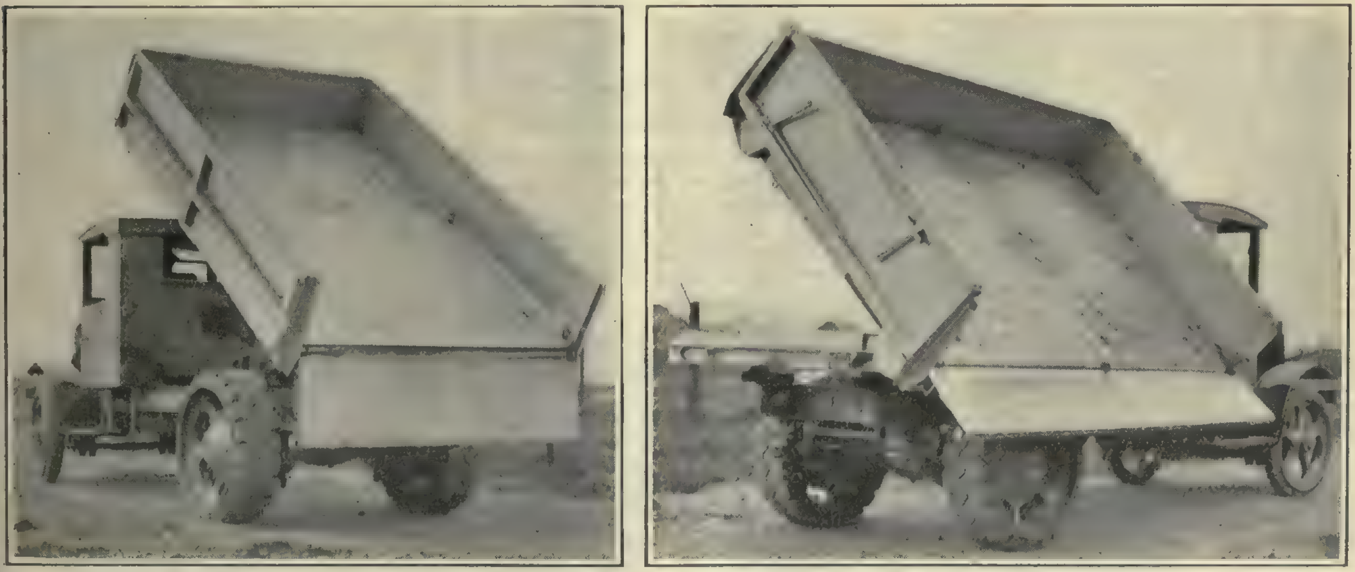


Forged Steel Pipe Clamp

Angle Cock Holder for Use with Varying Steel Brackets

The holes in the clamp through which the bolt passes are elongated so as to allow necessary movement of the bolt in the clamp. When the bolt is tightened up the two legs of the clamp are drawn in, and as this action takes place the bolt is forced up against the pipe. A few turns of the nut cause the bolt to bite into the pipe, thereby clamping the latter effectively.

The bolt is practically self-locking because of the lug provided on one of the clamp legs and the angularity of the clamp legs when in the clamping position. Double nuts or lock nuts are not essential unless the standard practice of the railway requires their use under such conditions.



At Left, the End-Dumping Construction Is of Particular Advantage in Crowded Sections. At Right, Position of Body When Dumping at the Side

American Association News

American Executive Committee Meets

PRESIDENTS of all sectional associations in the United States and of the Canadian Electric Railway Association, Canada, were invited to attend the meeting of the American Electric Railway Association executive committee held at the Hollenden Hotel, Sunday night.

Reports of standing committees and presidents of affiliated associations were made. There were also short addresses by some of the presidents of sectional associations.

For the Cleveland convention committee, J. H. Alexander reported that 119,007 sq.ft. of inclosed exhibit space has been purchased. When the space for working track exhibits under the canopy, and the outdoor car exhibits are included, the total space taken is much greater than at any previous convention of the American Association. He reported a total of 271 exhibitors. The car exhibit, which includes 41 different units, is the largest ever held in the history of the industry.

S. J. Cotsworth outlined the work of the entertainment committee. Transportation arrangements made for the convention were discussed by E. C. Faber.

Reports of other committees included that on policy by W. H. Sawyer; subjects and meetings by J. P. Barnes; publicity by Barron Collier; membership by J. H. Hanna; finance by R. P. Stevens and publications by E. C. Faber.

C. H. Harte reported for the Engineering Association, G. H. Clifford for the Transportation & Traffic Association, J. J. Duck for the Accountants' Association, and J. H. Handlon for the Claims Association.

For the committee on co-operation with manufacturers, a report was made by E. F. Wickwire; on management and operation, by R. F. Carbutt; on co-operation with the motor vehicle industry, by L. S. Storrs; on special taxes, by Leslie Vickers and on insurance by Paul E. Wilson.

Mr. Vickers pointed out that the overwhelming burden of taxation carried by the industry is awakening executives to the necessity for action. He said that at present there is no intelligent and scientific basis for taxation, and that collective action by the industry is needed to bring about general improvement. The gross-net tax is proposed as a uniform program and the committee has expanded its organization to give representation in each state.

At the invitation of President Coates, W. R. Robertson, president Canadian Electric Railway Association, outlined briefly the electric railway situation in Canada. Despite the automobile, bus and truck competition, electric railway business has grown from $17,000,000 in 1910 to $50,000,000 in 1925, Mr. Robertson said. The Canadian Association is making a study of bus and truck operating costs in comparison with those of electric railways and has a fact-finding committee going into the details of this situation.

A meeting of the new executive committee was held on Thursday afternoon with President W. H. Sawyer in the chair. The new presidents of the affiliated associations were presented to the executive committee. Mr. Sawyer announced that appointments would be made early in the year for committees on revision of the constitution and on location of next year's convention. Nov. 19 was selected as the date for the next meeting of the executive committee.

Old Engineering Executive Committee

SUNDAY evening the executive committee of the Engineering Association held a dinner meeting at the Hollenden Hotel. Those present were President Charles Rufus Harte, Vice-Presidents Daniel Durie and R. H. Dalgleish, Past-Presidents C. H. Clark and H. A. Johnson and G. H. Hecker, A. W. Baker and Morris Buck. The meeting was taken up largely with reports of action on various matters which have been pending for some time. It was decided to reorganize the equipment committee along the same lines as those adopted for way and structures a year ago. The standards committee will be reorganized accordingly.

COMING MEETINGS
OF
Electric Railway and Allied Associations

Oct. 25-29—**Annual Congress and Exhibit, National Safety Council, Book-Cadillac Hotel, Detroit, Mich.**

Nov. 5—**American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p. m.**

Nov. 16-18—**Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.**

Nov. 17-18—**Iowa Electric Railway Association, operating and maintenance section, annual convention, Fontanelle Hotel, Omaha, Neb.**

Nov. 16-19—**American Welding Society, fall meeting and International Welding and Cutting Exposition, Buffalo, New York.**

New Engineering Executive Committee Meets

SUBJECTS were assigned and committee personnel considered at the first meeting of the new executive committee of the Engineering Association held at the Hollenden Hotel, Cleveland, on Thursday evening, Oct. 7. Those present were President Daniel Durie, Past-Presidents H. H. Adams, Harley A. Johnson and Charles Rufus Harte; members L. D. Bale, R. H. Dalgleish, C. H. Jones, F. H. Miller and Pierre V. C. See, and guests A. W. Baker, A. T. Clark, H. H. George, G. C. Hecker and Clarence W. Squier.

It was agreed that the minutes of the last meeting together with those of the present meeting should be written up and sent to the various members of the executive committee for approval by letter ballot. The subjects committee assignments were reviewed and discussed. Some changes and additions were made. The report was then approved.

The personnel of the new engineering committee is nearly complete and an early start of the work is expected. Appointment of a representative on the National Fire Protection Association's committee on garages was discussed and it was considered that this might be a matter for work under American Engineering Standards Committee procedure.

The organization of a committee to revise the rules for procedure in approving standards was approved. This is needed properly to care for the changes necessitated by the reorganization of the way and structures committee, which was effected last year, and the equipment committee which is now being undertaken.

The organization and work done during the past year by the way and structures committee was discussed and some changes in procedure from that used in the past was considered desirable. These will also apply to other standing committees which are being reorganized.

American Engineering Standards Committee international co-operation in standardization work was discussed, and comments by the representatives of the Engineering Association are to be asked for. The American Wood Preservers' Association contemplates organization of a committee on pole service. Representation of the Engineering Association on this committee was authorized.

The American Institute of Electrical Engineers is organizing a committee which will develop standards for switchboards for power and light. Further information regarding the work of this committee is to be asked for.

The sponsors for some committees were approved and C. R. Harte was authorized to follow up recommendations of the heavy electric traction committee regarding the publishing of a bibliography.

Accountants Executive

MEETING in the English Room of the Hotel Hollenden on Sunday afternoon, the executive committee of the Accountants' Association approved the presentation at the convention of the reports of the various committees. It was decided to recommend the continuation of the same committee for next year. Members present were L. E. Lippitt, T. B. Kilfoyle, T. B. MacRae, E. A. Tuson, J. E. Heberle, E. H. Reed, C. E. Yost and J. J. Duck, president.

Claims Executive

DISCUSSION of the convention program and future policies was held by the executive committee of the Claims Association on Oct. 3 at the Hollenden Hotel, Cleveland. The subjects discussed included the work of the various committees of the association this year, topics to be referred to the consideration of the incoming executive committee and the appointment of a committee to consider conditions for a safety contest for the Anthony N. Brady medal. This medal was offered annually for a number of years before the war to the electric railway company making the best safety record. This award was discontinued during the war, but announcement has recently been made by executors of the Brady Estate that it will again be available. Those present were J. H. Handlon, president; C. B. Proctor and J. S. Kubu, vice-presidents; S. J. Herrell, Knoxville, H. O. Allison, New Brighton, and G. T. Hellmuth, Chicago, members of the executive committee; W. F. Weh, Cleveland, past-president, and G. C. Hecker of the association staff. Mr. Hellmuth acted as secretary.

Old T. & T. Executive

TRANSPORTATION and Traffic executive committee members met in the Hollenden Hotel, Cleveland, on Sunday evening, Oct. 3, to discuss plans for the coming year. The suggested program for next year's topic developed by the subject committee in the meeting in the afternoon of that day were tentatively adopted.

Those present at the meeting were: George H. Clifford, president; T. C. Cherry, John Colton, Samuel Riddle, E. M. Walker, J. V. Sullivan, G. B. Anderson, and Melvin W. Bridges.

New T. & T. Executive

TOPICS for next year's committee considerations were mapped out at the Transportation & Traffic executive committee meeting held on Oct. 6, in the Hollenden Hotel. Three committees of this association will perform the work done by four committees the past year.

Bus operation will be under the sponsorship of Paul E. Wilson and A. R. Myers. General subjects suggested for this committee were: fare collections methods; bus rules; operation of buses in competition with railways, and size of buses for different classes of service.

Traffic and safety will be under the sponsorship of Samuel Riddle, W. H. Boyce and E. M. Walker. Part of the work of this committee will be done jointly with the Claims Association and the plan was suggested of having a joint session at the next annual convention.

"Service betterments" will be the title of the committee previously functioning as "merchandising transportation." This committee will be sponsored by Edward Dana and G. B. Anderson. Topics suggested for this committee's consideration were all matters pertaining to the furnishing of a superior service to the public such as more comfortable seating, use of signs, simpler fare and transfer collections, courtesy of employees and other allied matters.

W. H. Sawyer, president-elect of the American Electric Railway Association, looked in on the meeting. He offered many valuable suggestions and assured the executives of the Transportation and Traffic group of the continued support of the parent association. Mr. Sawyer spoke of the co-operation desired on the part of the new traffic and safety committee in connection with working out certain details of the American committee on the Hoover Conference. The meeting was attended by J. V. Sullivan, president-elect, G. B. Anderson, E. M. Walker, A. R. Myers, Samuel Riddle, E. J. Murphy of the association headquarters, W. H. Boyce and John Dewhurst.

T. & T. Subjects

CONSIDERABLE thought and discussion were given by the subjects committee of the T. & T. Association at its meeting at Cleveland on Oct. 3 to the value of continuing four subjects —used during the last two years for transportation and traffic committee investigations. The subjects committee of this association considers that it would be valuable to adopt different subjects for the coming year. After careful consideration, it was decided that three general topics would be adopted for committee work. They are: Bus operation; service improvement; traffic and safety. Each of these three general subjects will be expanded into a number of topics, which will ultimately be assigned to sub-committees of each of the three main committees.

Those in attendance at the meeting were George H. Clifford, chairman; J. N. Sullivan, John Colton, W. H. Boyce, J. W. Welsh and John A. Dewhurst.

Exhibit

PRIOR to its scheduled meeting held in Cleveland on Oct. 3 the exhibit committee examined all of the displays between 10 and 11:30 Sunday morning and held one of the shortest meetings on record. There was nothing left to be done except to register a vote of thanks to Director Fred C. J. Dell and the Cleveland convention committee for their excellent accomplishment in assembling the splendid array of transportation equipment, supplies and accessories.

Mr. Dell reported 119,007 sq.ft. of inside space sold to 271 exhibitors. In addition about 1,900 lineal feet of track space or 50,000 sq.ft. is used by the most pretentious car show ever held by the association. Forty-one cars of modern type were on display, as well as many pieces of service equipment. The total actual exhibit space including the cars and open track is over 180,000 sq.ft. The bus, truck and allied accessories space is 23.8 per cent of this total.

Joseph H. Alexander, chairman, conducted the inspection trip. The meeting was attended by L. D. Bale, Fred B. Bullock, Frank W. Campbell, C. H. Clark, S. J. Cotsworth, H. Fort Flowers, B. A. Hegeman, Jr., R. R. Holden, C. E. Morgan, A. Frank Paul, A. M. Robinson, L. W. Shugg, and Fred C. J. Dell.

Taxation Plans Discussed at Special Meeting

INFORMAL discussion took place on the general subject of taxation with particular reference to the recommendation by Leslie Vickers, economist of the American Electric Railway Association, at the taxation meeting Thursday morning. Copies of a recent article defining the gross-net tax principle were available and an abstract of an analysis of public utility taxation systems in the various states was presented by Mr. Vickers.

The meeting, which was called as a special sessions of the taxation committee, was augmented by the recently appointed advisory members. Since no members of the taxation committee were present F. W. Doolittle, vice-president North American Company presided. After a brief talk on the gross-net tax by Mr. Vickers, all of the fourteen delegates in attendance, most of whom were advisory members of the committee, were called upon for remarks.

The consensus of opinion was that any plans involving general tax revision would have to be considered cojointly with other utility representatives; if not, representatives of industries. The general principle of a sane and uniform taxation basis was approved and no objections were presented to the gross-net tax plan suggested.

International Road Congress

FIFTEEN HUNDRED delegates from 50 nations met at the Fifth International Road Congress held in Milan and Rome, Italy, from Sept. 6 to Sept. 15, to discuss city traffic and adaptation of successful methods to suit local conditions. The United States which has been an onlooker for several years became an active member, and the next world congress to be held in 1928 will meet in Washington, D. C.

T. H. MacDonald, chief of the Bureau of Public Roads, was the chief spokesman of this country. He explained the relationship between highways and civilization.

Iowa Operating and Maintenance Men to Meet Nov. 17-18

OPERATING and maintenance men of the Iowa Electric Railway Association will hold the annual convention of their sections on Nov. 17-18 at the Fontenelle Hotel, Omaha, Neb.

The News of the Industry

Philadelphia Lease Signed by Mayor

Despite popular disapproval Mayor Kendrick of Philadelphia, Pa., on Oct. 13 signed the ordinance providing a 30-year extension of the Frankford elevated agreement with the Philadelphia Rapid Transit Company. His signature was affixed to the document following a meeting with members of the transit commission, four of whom were opposed to the negotiation of the lease. The Mayor said that he "about understood the various sentiments of the commission members" and would not call for a vote on the question.

Alva B. Johnson, who represented the chamber of commerce on the commission, filed a report declaring his objections to the lease negotiations at this time. He recommended that the ordinance should not be signed and should be returned to the Mayor by the Council with the request that it be included in a new agreement to cover the entire transit properties. Charles B. Hall, president of the City Council and sponsor of the elevated agreement, declared that the funds released by the new agreement probably would not be used to meet the Sesqui expenses. It was charged that the lease had been amended to make available $5,000,000 for payment of the Sesqui deficit.

Under this new agreement the Philadelphia Rapid Transit Company will make an average annual return of $780,000.

Many Moves in New York Fare Referendum Action

The legality of the submission to the voters of the 5-cent fare referendum in New York city was upheld on Oct. 13 by the Appellate Division without written opinions. The views of the Supreme Court Justices, from whose decisions appeal was taken, were supported by the higher court. The referendums will appear on the ballot at election day unless the Court of Appeals reverses all the previous decisions.

Charles L. Craig, former comptroller and author of the bill which would allow a popular vote on whether transit fares could be raised without submitting the matter to the people, successfully argued that the referendum was legal under the City Home Rule Law and the Home Rule Amendment. Modification of subway contracts or franchises in other particulars than fares could still be effected, he said.

The 5-cent-fare referendum was attacked again on Oct. 14 from a new angle, when two transit companies filed suits in the Supreme Court to enjoin the Board of Elections from submitting the question to the voters in the coming elections. It was expected that Justice John M. Tierney would hear argument on Oct. 15 on the application for an injunction pending trial.

Unlike the previous action, the suits filed on Oct. 14 will be pressed by the transit lines themselves, on the principal ground that they will be deprived of property if the referendum results in approval of the proposition that fares may not be raised without a favorable vote of the majority of the city electors. The attorneys for the companies hope to get a definite ruling from the Appellate Division on all the points involved. The previous suit was a taxpayers action.

Counsel for the transit companies declared that his clients wanted a ruling by the Appellate Division on the constitutionality of the referendum. He said:

> The affirmation of Justice Valente's decision by the Appellate Division left this point undecided. We believe the law to be unconstitutional and harmful. In starting the new actions we may be able to save taxpayers the expense of holding a referendum on a law that later may be found unconstitutional.
>
> Justice Valente dismissed the first petition on three grounds: that the taxpayer was not a party to the action, that the legislation should be completed by the holding of the referendum before the court passed upon it, and that the law was constitutional. The Appellate Division in affirming Justice Valente's dismissal of the petition did not state how many of these points had been sustained. By establishing the petitioners in the present case as parties to the action, we hope to obtain a ruling on the two other points, including the constitutionality of the law.

Opposition Develops to Toledo Grant

Board of Control Outlines Objections to Modification of Present Milner Grant—Ordinance About to Go to Public for Ratification—Terms of Grant Reviewed

OPPOSITION to the submission to the electors of the proposed railway franchise to replace the Milner ordinance now in effect in Toledo was voiced by the Street Railway Board of Control in an opinion rendered to the committee of the Council which now has the ordinance under consideration.

The ordinance was drafted by Frank M. Dotson, city law director, and Attorney Dewey C. Bailey, representing Henry L. Doherty & Company, and approved in its legal and engineering details by Newton D. Baker, Cleveland attorney, and Prof. Henry E. Riggs of University of Michigan, experts hired on behalf of the city of Toledo.

The board in its analysis of the ordinance sees no prospect for lower fares within five years, that better service is only implied and not guaranteed, and that big burdens are transferred from the company to the city—paving obligations mostly—without corresponding benefits to the car riders.

It is also pointed out that the grant is monopolistic and by its terms practically perpetual with inadequate provisions for forfeiture in case of violation of the ordinance.

Defects in the Milner plan are conceded, but it is pointed out that many things the city would do under the new plan could voluntarily be assumed under the present ordinance.

In the communication of the board, signed by its three members—David H. Goodwillie, chairman; Henry Truesdall, banker, and William W. Knight, wholesale hardware merchant — failure of both the city and company to carry out important provisions and the spirit of the Milner ordinance is cited as partial cause for the present condition of railway service in Toledo. More extensive use of private motor cars is also presented as one of the big obstacles to the successful working out of the Milner plan not contemplated when it was put into effect six years ago.

Failure of the city to eliminate wildcat bus competition has also hampered the company. The city, too, failed to take advantage of the requirement for securing added new capital under the Milner plan.

The board desires all defects in the Milner ordinance to be cured and some adjustment made in capital value. Professor Riggs in his original report indicated some such step was necessary, but no provision for it was made in the ordinance. The board says:

> This new ordinance proposes to make a new 25-year grant. Why not then correct all the unwieldy and objectionable features of the Milner ordinance, and if we are to grant monopoly of service, let us have capital values reduced to an amount commensurate with earnings and take into account the railway situation of today and not that of 1920!

By continuing under the Milner ordinance until a more equitable plan is found the board members feel that the city would be free to negotiate other franchises.

Toledo's new ordinance embodies within its text changes in the city charter which will permit the company to have a complete monopoly of railway and bus transportation within the city for 25 years. The present city charter prohibits any exclusive monopoly of any public service.

The ordinance contemplates a five-year reconstruction program in which the Doherty interests would furnish $1,051,600 of new capital to go for the purchase of buses, replacement of tracks and other improvements. Failure to provide the necessary capital would forfeit the exclusive grant.

Control of the city transportation is

vested in the board of street railway control rather than in the City Council as at present. The board is composed of three members named by the Mayor for terms of six years each. The present board would continue under the new ordinance.

No maximum nor minimum fare is named in the ordinance but full power is vested in the board of control to fix a sliding scale that will meet requirements of the stabilizing fund, and various other operating and sinking fund requirements. Bus fares are set at 10 cents to begin with, but railway fares remain as at present—10 cents cash, three tickets for 25 cents, and 1-cent transfer.

The ordinance relieves the Community Traction Company of an old paving obligation of $182,421 owing to the city and provides also that the company will not have to pay for paving or repairing of pavement between tracks nor for the foundations for new tracks when new pavements are laid.

In the interests of economy of operation there is a provision that wages shall not be in excess of those paid for similar service in similar lines of business in cities of the same relative size and importance.

The ordinance makes it mandatory for the Community Traction Company to purchase power from the Toledo Edison Company, but if the rate is not satisfactory to the board of control it is to be fixed by the Ohio Public Utilities Commission.

The city purchase plan of the Milner ordinance by which the city now has become the owner of $1,261,000 of common stock is eliminated, but a similar amount is to be set aside for the depreciation fund to pay for replacements of equipment and some betterments.

Provision is made for sale of weekly pass, lease of the lines by the city, and lease by the city of land in the downtown district for a car storage yard. Arbitration of differences between company and board of control is also provided.

In the Riggs report the need is suggested of scaling down the capital.

Plans for fifteen bus routes—some feeders and some through lines—as outlined in the Riggs' recommendations are carried in the ordinance.

Fares in Pasadena Fixed by Commission

The Pacific Electric Railway has been authorized by the Railroad Commission to establish the following schedule of fares for motor coach and railway service in Pasadena, Cal.: One-way cash fare (one zone) 7 cents; one-way cash fare (between zones) Pasadena-Altadena, Pasadena-Country Club, Pasadena-East Washington Street, 12 cents; book tickets (good within either zone 1 or zone 2) eight for 50 cents.

Modified Lisman Plan Presented

Conditions Recapitulated Under Which Eastern Bankers Would Undertake Chicago Unification Program—Aldermen Still Frown Upon Proposal

A NEW draft of an ordinance embracing the plan proposed by Frederick J. Lisman of Lisman & Company, New York bankers, for the solution of Chicago's traction problems differing considerably from the original proposal made on Sept. 17 was submitted Oct. 2 to the City Council committee on local transportation.

In compliance with Alderman A. F. Albert's objection that the railways should not be paid for doing their own extension construction, the initial proposals of the Eastern bankers for the payment of 10 per cent interest to construction companies building extensions to street car lines were abandoned in the revised ordinance.

Briefly, the new draft contemplates the following steps:

Holders of $95,000,000 of first mortgage bonds of the Chicago Surface Lines, due Feb. 1, 1927, would receive new first mortgage bonds payable in twenty years.

New capital to the extent of $250,000,000 would be invested in extensions, subway construction and other improvements. Of this sum, the new company will make available immediately $45,000,000 in cash for extensions. An additional $50,000,000 would be invested "during the twenty-year term of the franchise." If the Legislature and the city grant an indeterminate permit, $150,000,000 more would be spent. If such a franchise is not eventually granted, the $150,000,000 would be spent at the rate of $50,000,000 during each ten-year extension of the twenty-year franchise.

The company will advance immediately some $6,500,000 as half the cost of building a subway for surface cars, extending from the West Washington and Van Buren Streets tunnels under the Chicago River and running "U" shape under Washington, Michigan and Van Bureau Streets. The other half of the cost would be raised by levying charges on property owners whose holdings abut on subway platforms and at entrances.

In connection with the proposed $24,000,000 subway under State Street between Eighteenth Street and Chicago Avenue, the Lisman syndicate would contribute $8,000,000 if the city contributed a like sum from the present traction fund and property owners raised the balance through special assessments. The company's share would be applied on the rental for the use of the subway, which is to be leased to the company for twenty years.

The elevated lines would either be purchased by the syndicate or it would enter into an operating agreement for the interchange of transfers between surface, elevated, subway and bus lines.

The present 7-cent fare on the surface cars would be maintained for the time being and a 1-cent charge made for transfers between surface and elevated lines on the buses. The ordinance provides, however, for service at cost and the creation of a stabilization fund. Instead of being made up from the proceeds of bond sales, this fund would simply be taken out of the city traction fund.

Under the financial terms proposed default in principal on more than $165,000,000 of bonds maturing early next year will be avoided and the security holders protected. Old and new first mortgage bonds are both to be paid off within twenty years.

At the end of 30 years the city will obtain without cost and free of all debt the transportation system to be created under the new ordinance.

Opposition to the Lisman proposal still persists in meetings of the City Council sub-committee.

The questionable part of the plan, according to Major R. F. Kelker, committee engineer, hinges on the amortization of $50,000,000 of new money in first mortgage bonds out of 2 per cent of the gross receipts, or just one-fourth of the amount heretofore set apart in the renewal and depreciation funds.

"If any part of these funds is taken out without provision to return them soon," said Major Kelker, "the fare may have to go up to pay for rehabilitation."

Leonard A. Busby, president of the Chicago City Railway, estimated that the total payments to the amortization fund would run to more than $8,000,000 a year.

"This would mean," he said. "a 1-cent, 1½-cent, or possibly even 2-cent increase in each fare. If anybody thinks you can amortize $145,000,000 (the $50,000,000 in new money plus $95,000,000 bonds to be exchanged for present first mortgage bonds) in twenty years without going into the car riders' pockets, he has another guess coming. It can't be done."

SUB-COMMITTEE ASKS APPROVAL IN NAMING COMMITTEE OF CITIZENS

After a series of prolonged and heated debates, the local transportation committee, which is charged with evolving a suitable traction ordinance before the present Surface Lines franchises expire four months hence, decided on Oct. 8 to ask the Chicago City Council to approve the naming of an advisory committee of private citizens at its next meeting, early in November.

The citizens finally agreed upon for membership on the commission are James Simpson, president of Marshall Field & Company; Stuyvesant Peabody, president of the Peabody Coal Company; William R. Dawes, banker and president of the Chicago Association of Commerce; W. A. Wieboldt of W. A. Wieboldt & Company; M. E. Greenbaum of Greenbaum & Sons, bankers; Patrick A. Nash, contractor; George Woodruff, banker; John Hayes, hotel proprietor; Richard Bland and a Chicago Real Estate Board representative. The City Council will be asked to select seven from this group.

This board of citizens was pictured by its advocates as a means of permanently solving the entire local transportation problem. Alderman Joseph McDonough, the committee's chairman, pointed out that as the Surface Lines grant expires next February "We must act fast, and I think it is time the public knew we are not playing politics. Selection of a citizens' committee is the way to prove it."

Others, however, declared that the group will be only an advisory body and that practical business men will not relish the idea of indulging in the oratorical sessions of half a score subcommittees.

The plan for a citizens' advisory committee was approved by the local transportation committee last June, but its execution has been delayed in the hope that progress could be made between the Aldermen and traction officials without resorting to outside aid.

If appointed, the advisory committee will sit with the traction sub-committee in its dealings with the local traction executives and baskers.

Help Needed by Denver Tramway

Committee of Chamber of Commerce Sees Situation as Serious Unless Income Can Be Increased or Expense Be Cut—An Economic and Civic Problem Is Before City

IT APPEARS to a committee of the Chamber of Commerce of Denver, Cal., of which Judge W. Freeman is chairman, that the present operation of the Denver Tramway presents a very discouraging and alarming economic prospect for the future of the institution as a going concern in the city of Denver. As the committee sees it, there is no hope for the permanency of the operation of the company unless its income can be substantially increased, or its cost of operation can be substantially reduced.

The committee appointed to look into the economic situation surrounding the operation of the railway gave a good deal of time to the matter and had Ernest Stenger, president of the tramway, present at two of its sessions. At the request of the committee Mr. Stenger filed with it a copy of the communication which the Tramway company filed with the City Council of the City and County of Denver, together with the data attached thereto.

Mr. Stenger assured the committee that every economy was being adopted and that the prospect of further substantial reductions in operating costs could be considered negligible.

After going into the matter quite fully the committee believes that an improvement can come only from one of two sources, or a combination of two sources:

(a) That the fare be increased; (b) that the patronage on the present rate be substantially increased.

Doubt is expressed as to whether a very substantial increase in fare would not automatically reduce the patronage to a degree that would probably more or less defeat the objective.

Suggestion was made that if certain improvements in service could be had it would unquestionably result in a larger patronage in certain sections of the city, but the committee says that this would involve a cross-city service—broadly, between Washington Park and the Stockyards area. Whether this is practical or not the committee expresses no opinion in view of the fact that it would involve certain new construction and also raise the question of franchise over new streets, which could only be given by special election, and would be expensive and the result doubtful.

The committee says that the most practical suggestion it has discussed is a program of education pointing out the desirability of an increased patronage of the tramway by people who are so largely using automobiles for transportation between home and the downtown district in the ordinary course of the day. The committee was assured that if 10 per cent additional fares could be had on the present rate the economic situation of the tramway would be bearable. It was practically convinced that this was the most desirable solution of the whole question and one that would be of benefit to the individual, to the tramway, and to the community at large. The committee was not sure as to the method that would be most effective in this respect. The means to the end must be purely educational and must be based upon some appeal other than that of direct benefit to the tramway as a privately-owned enterprise.

The committee was persuaded that a community of the size of Denver cannot do without the service of a tramway and that, equally, the tramway cannot operate except on the basis which will take care not only of the current expense and upkeep but also a reasonable, if modest, income to the owners. The committee sees the matter as a community problem wholly apart from the fortune or misfortune involved in the ownership of the tramway.

The committee expresses no opinion and makes no recommendation as to whether or not the Chamber of Commerce should initiate a program to bring about a larger patronage of the street car. Its opinion merely is that from a community point of view something must be done to prevent great inconvenience to the community at large.

In conclusion the committee said:

> Your committee believes that with this report its functions should terminate and that if the Chamber, in light of the information herein transmitted, feels that it has a legitimate and promising field in which to function in the matter, the Chamber should itself determine the further ways and means for carrying out any procedure which, after full discussion in light of this report, the Chamber feels it should take.

Mayor Loath to Lose White Plains Trolley Lines

The proposal of the Third Avenue Railroad, New York, to substitute buses for trolleys on the Mamaroneck, Scarsdale and Silver Lake lines and to keep trolley cars running on the Tarrytown line at a 10-cent fare was rejected recently by Mayor Frederick C. McLaughlin and the Common Council. Instead, the city will seek to require the company to operate cars in White Plains for a 5-cent fare, as provided in the franchise of the Westchester Street Railway, which the Third Avenue interests purchased a few weeks ago at auction for $70,000.

Trolley cars have been running with a 5-cent fare since June 1, when Leverett S. Miller, then receiver, planned to discontinue them for buses. Prior to that time the fare had been 10 cents in zones. The Mayor is reported to have said:

> We are not by any means sold on the desirability of buses. It has not been fully demonstrated that they are preferable to trolleys. It might be a great mistake for White Plains to lose its trolley system at the present time.

Work Begun on Kansas City Rehabilitation

The Kansas City Public Service Company, Kansas City, Mo., following the approval of a twelve-year extension to the local city franchise, began on Oct. 11 to carry out several promised improvements and repairs. The actual beginning of the promised work was called to public attention through a double-page announcement carried in both morning and evening papers. The work under way is a portion of an outlay of about $6,600,000 to be made in rehabilitating the system.

Frank L. Conrad, vice-president of the company, said that crews will be put to work as quickly as they may be organized and that, granted open weather until late in the coming winter, the company expected to have much of the proposed work finished by the beginning of the snowy season.

Plans are also being formulated for the construction of two new substations, each to cost approximately $250,000, and a new carhouse to cost about $300,000. A new garage is also contemplated, and plans are now being drawn for an ornamental viaduct to be constructed at 43d Street and Millcreek Parkway, replacing the present unsightly trestle at that location.

Notice of intention to circulate petitions for a popular referendum on the twelve-year extension of the local franchise was being prepared early during the week ended Oct. 16 by Herman M. Longworthy. Such a notice, to be legally effective, must be filed not later than Oct. 15. If filed by that date, the notice will automatically delay the effectiveness of the franchise extension ordinance 30 days. About 15,000 persons must sign the petitions before a referendum may be taken.

A meeting of the special franchise committee of the City Council was announced for Oct. 14 to confer with officials of the railway about a complete new franchise. It is said that the old franchise will be considered, section by section. President Woolfolk has expressed his willingness to work with the city, or its Council committee, at any time, to formulate a new franchise which would be satisfactory to the public, the city officials and the company. The idea is to have the new grant supersede the present franchise and its twelve-year extension, voted by the City Council two weeks ago.

The special committee was appointed on Oct. 11 at the suggestion of Mr. Woolfolk.

Chicago Extensions in Effect

Officials of Rapid Transit Lines and Aurora & Elgin Announce Details of Operation

The Chicago Rapid Transit Company, Chicago, Ill., has extended service westward to Maywood, Bellwood and Westchester. This new "L" service now places the new model suburban residential community of Westchester within 42 minutes of the Loop.

Rapid Transit trains are operated direct from the Loop to Maywood, Bellwood and Westchester over the Garfield Park branch of the Metropolitan division. A 24-hour-a-day service is being maintained, with express service at twelve-minute intervals throughout the day. Eight-car trains are now operated between the new Westchester terminal and the Loop in the rush-hour periods. This means an extension of "L" service westward from the present terminus at Des Plaines Avenue, Forest Park, over the tracks of the Chicago, Aurora & Elgin Railroad. Rapid Transit trains now operate southward from Bellwood to Roosevelt Road, Westchester, over the new tracks just recently completed.

This new Rapid Transit service has replaced the Chicago, Aurora & Elgin local service to and from Chicago. However, the Aurora and Elgin is continuing to maintain stations at Fifth Avenue, Maywood, and at Bellwood, where passengers are received and discharged to and from all points west of Bellwood. For this same purpose the present stations also are maintained at Marshfield Avenue and Laramie Avenue, Chicago; Oak Park Avenue, Oak Park, and Forest Park.

Through this operating arrangement greater transportation facilities are offered both within and beyond the Chicago Metropolitan District. Extension of Rapid Transit service means improved service for Maywood and Bellwood. The release of Aurora and Elgin equipment from this local service likewise will mean improved service for Elmhurst, Lombard, Glen Ellyn, Wheaton and communities further west.

Rapid Transit trains to and from Westchester are operating around the Loop and free transfer privileges enable one to transfer without additional charge to and from "L" trains reaching all other sections of Chicago.

Further improvement of facilities for the proposed extension of the service of the two railway companies westward will be made in the near future with construction of the new Wells Street terminal, to be used jointly by the "L" and Chicago, Aurora & Elgin lines.

Commodious Station at Bellwood on New Chicago Rapid Transit Line

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Improvements on Elgin Line

Increased service, adjustment of train schedules for the greater convenience of passengers, a new midnight flyer to Fox River Valley points and an additional limited train at 11 p.m. were recently announced by Col. E. J. Blair, general manager of the Chicago, Aurora & Elgin Railroad, Chicago, Ill. The changes were effective Oct. 1. At the same time Colonel Blair announced that contracts had been let for the new Chicago loop terminal at Wells Street, and that right-of-way had been improved with runs around the track at Forest Park and Oak Park. This will permit of faster operation. Construction work on the new station will be commenced as soon as possible. In addition the right-of-way east of Wheaton has been improved by laying 2,100 tons of 100-lb. rail. Colonel Blair believes that the taking over of the local service to Maywood and Bellwood by the Chicago Rapid Transit Company will materially aid the value of the service of the Aurora-Elgin Line.

New Line Projected in Milwaukee

The Milwaukee Electric Railway & Light Company has applied to the Wisconsin Railroad Commission for permission to construct a new electric railway south of the city of Milwaukee. The new line will be located in the towns of Lake and Oak Creek, connecting with the present southern terminus of the Vliet-Howell Avenue line, where it will be joined to the freight line to be built west from the Lakeside power plant to the Chicago, Milwaukee & St. Paul Railroad tracks. The proposed line would form a connection between the Howell Avenue line and the proposed cut-off west of Cudahy and South Milwaukee. It will provide a rapid transit service similar to the Waukesha rapid transit line, connecting Milwaukee, Racine and Kenosha.

Eight Cents in Duluth

The Duluth Street Railway, Duluth, Minn., will collect a cash fare of 8 cents or will sell tokens at the rate of five for 35 cents, beginning Oct. 15, in accordance with an order made on Oct. 4 by the Minnesota Railroad and Warehouse Commission, with one of three commissioners dissenting. The order followed hearings on the application by the company several months ago and is based on the theory of allowing the company a return of 7½ per cent on its property valuation, the same as in the Twin City Rapid Transit cases of last year. The found valuation is $5,291,710, as of Dec. 31, 1925. Passengers carried that year totaled 25,149,212, to date in 1926 24,193,209, and the company's estimate for 1927 is 23,273,867. The application which has just been acted upon by the commission was filed July 31, 1925. The commission also indicated that the rate of 8 cents cash and six rides for 40 cents established in the Twin Cities would be comparable to a 10-cent cash fare in Duluth, with six tokens for 40 cents.

An appeal was taken from the commission's ruling of July 13, 1922, ordering a rate of 6 cents cash and five rides for 25 cents to the U. S. District Court. Following the order of the court establishing this rate another application was made. The valuation as of December, 1921, was found to be $4,599,978. The return was set at 7½ per cent and the 6-cent rate made effective Aug. 1, 1922. The city appealed to the district court and the railway applied to the federal court for an injunction on the ground that the rate was confiscatory. The injunction restrained the commission from interfering with the collection of not more than 6 cents cash. On Jan. 24, 1925, the federal court permanently enjoined the commission from enforcing its order of July 13, 1922, until such time as the commission would establish a just and reasonable rate of fare. This decision was appealed to the United States Supreme Court.

The dissenting commissioner, O. P. B. Jacobson, said action should be withheld until a ruling has been rendered on the appeal taken to the U. S. Supreme Court from the district court.

Half Pay Pensions for New Jersey Employees

Changes in the welfare plan of the Public Service Railway, Newark, N. J., which provide what is practically half pay pensions for employees upon retirement, were announced recently by President McCarter. He said the new provisions were voted by the boards of directors "as a further recognition of the faithful and loyal service rendered by Public Service staff."

The new provisions are retroactive and apply to the 192 former employees now receiving pensions as well as to all other eligible employees. Employees upon retirement will receive a pension computed upon the average yearly wage or salary received during the five years next preceding the date of retirement. For each year in the company's employ they will receive 2 per cent of such average pay, this allowance being double that which was formerly made. The maximum pension payable after 25 years service will be half pay, but no pension will be less than $500 a year. For exceptionally long employment additional provision is made. For men retirement is optional between 65 and 70 years of age and compulsory at 70 years; for women, optional between 60 and 65 and compulsory at 65 years.

The Public Service welfare plan was established Jan. 1, 1911.

Baseball Crowds in St. Louis Handled Expeditiously

The United Railways, St. Louis, Mo., handled effectively on Oct. 5 one of the city's greatest transportation problems. In the afternoon the opening St. Louis game of the World Championship Baseball Series was played at Sportsman's Park, Grand Boulevard, while that same evening the annual parade of the Veiled Prophet was held.

To handle the 40,000 fans who managed to get into the baseball park and many additional thousands the railway maintained special service on nine lines running to or near the ball park. When the baseball game was over the company had cars available on all of the lines sufficient to handle the fans with a minimum of delay.

Petition of Gloversville Road Heard

The Public Service Commission recently heard the petition of the Fonda, Johnstown & Gloversville Railroad for permission to increase passenger fares on its New York electric division in the cities of Gloversville, Johnstown, Schenectady and Amsterdam and the villages of Fonda, Fort Johnson, Hagaman and intervening stations. The company proposes to increase fares from 3 to 3½ cents per mile on interurban lines and to 8⅓ cents in municipalities, with a maximum charge of 10 cents for individual rides. It proposes to issue six tickets for 50 cents and school tickets in coupon books of 100 for $5.30. "Workmen's tickets," so called, would also be issued at the rate of three for 25 cents. In its petition the company states that the gross revenues derived from the operation of its electric division for some years past have been so seriously impaired by the use of automobiles that the proposed increase in fare is immediately needed.

Program of Improvements Fast Being Completed in Hamilton

Answering questions as to what progress is being made with the various improvements to the railway system provided in the agreement reached between the city and the company last spring, George E. Waller, general manager of the Dominion Power & Transmission Company, stated that there were now ten buses in operation on the Cannon Street and Main Street routes and that orders for 24 new street cars would be placed within 30 days. Work of relaying the tracks on King Street, East, has just been completed and the work on Barton Street between Ottawa Street and Kenilworth Avenue will be finished soon. The company has purchased all the land necessary for the erection of the new carhouse and all that is holding up the spending of approximately $300,000 upon these buildings is the closing of part of King William Street by the city.

Wages Adjusted to Living Costs in Salt Lake City

A reduction of 1 cent an hour in the wages of the platform employees of the Utah Light & Traction Company, Salt Lake City, Utah, has been made in accordance with a contract between the company and the employees by which the wage scale is to fluctuate with the cost of living in Salt Lake City. The living costs are taken from the United States bureau of labor statistics. This month the bureau reported a reduction in the cost of living of 3.1 points for the first six months of this year.

The reduction went into effect on Oct. 1.

Strike Off in Asheville

Striking employees of the Carolina Power & Light Company, operating in Asheville, N. C., returned to work on Sept. 29 under exactly the same conditions and same wages as prevailed prior to the strike. These conditions and rates of pay were covered by a contract to run two years.

The strike in Asheville was occasioned on Sept. 25 when the men quit work after the company refused to accede to demands for an increase in pay of 10 cents an hour, a six-day week, pay for time off for lunch and the execution of an agreement whereby the same working conditions would extend to the bus operators. In the past the company has been unable and unwilling, for operating reasons, to make it an inflexible rule that men should have one day off a week. However, the company has been allowing the men, when they so requested, one day off each week and many of the men have been availing themselves of this privilege. Other men have desired to work seven days a week, and this has also been permitted. Under normal conditions all platform men who so desire will have a day off each week as heretofore.

News Notes

Educational Courses in Milwaukee.—What it purposes to accomplish for the educational advancement of its employees is outlined by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., in a 36-page pamphlet entitled E. M. B. A. Educational Program. Under the slogan "The Trained Man Wins" many and varied courses are herein described, advice given to members of the Employees' Mutual Benefit Association on elective subjects and general information on class hours, home work and books. Many courses are offered on utility operation, each one dealing "with some particular phase of our service or the operation of our system." All educational work is supervised by the staff of the educational department.

Utility Courses Will Not Conflict with Students' Employment. — The Northwestern University School of Commerce, Evanston, Ill., will begin its afternoon and evening courses in public utilities in Wieboldt Hall, Chicago Avenue, Chicago, on Oct. 14. The first semester will terminate Feb. 12. The second semester starts Feb. 21 and concludes June 13. These courses emphasize the economic, financial, legal and managerial principles underlying effective operation and management and the problems arising out of public regulation and control. Many of the courses are offered in hours which will not conflict with a student's regular employment. These courses are offered by members of the regular faculty, or members of the staff of the Institute for Research in Land Economics and Public Utilities, which has recently become affiliated with Northwestern University.

Utility Courses at Indiana U.—Indiana University, Bloomington, Ind., through its School of Commerce and Finance, is again offering a course in the principles of public utility operation. The co-operation of the Indiana Public Utilities Association has been obtained to give the practical information to students. Executives of the association's member companies will deliver addresses on some phases of the utility industry, to supplement the classroom and textbook work. Dean William A. Rawles, in announcing the course, explained that it was not intended to be a professional course for the training of future utility executives, but a course in general information on utilities for young men planning to enter the business world.

More One-Man Cars at Montreal.—The Montreal Tramways, Montreal, Que., has selected four routes on which to start the new one-man cars. They are: Guy-beaver Hall, St. Antonie, Amherst and Notre Dame East. Oct. 12 was set as the tentative date for the starting of the new service. On that day the regular two-man cars were to be withdrawn on the four routes and only one-man cars run. J. E. Hutcheson, vice-president and general manager of the company, said that the change to one-man cars would mean a more frequent service. All of the 50 cars ordered some time ago from the Canadian Car & Foundry Company have been delivered. The employees are now undergoing a course of training qualifying them to serve as motormen and conductors combined.

Foreign News

Berlin Officials Visit American Cities

F. Lademann, in charge of traffic of the Berlin Street Railway, Berlin, Germany; F. Lange and H. Amberg, members of the advisory board of the city of Berlin, are on a tour of the United States to study traffic and transportation conditions. They were in New York on Oct. 2. They plan to visit Boston, Cleveland, Chicago, Detroit, St. Louis, Pittsburgh, Washington and Philadelphia. The party expects to be back in New York on Nov. 1.

New Electric Railroads in Germany

Two sections of the Berlin Town, Circle & Suburban Railroad have so far been electrified, that between the Stettiner station and Bernau, 15 miles, and that between the same station and Oranienburg, 17½ miles. Work is now in hand on the electrification of the section between the Tegel section and Velten. On the two completed lines 29 "half-trains" are in use, these consisting of two motor coaches and two non-motor coaches, each train having accommodation for 800 passengers. Owing to the greater acceleration and speed of the electric trains over the old steam system the time for the journey between Berlin and Bernau, including stops at intermediary stations, has been reduced from 48 to 36 minutes.

One-Man Operation in Switzerland

An electric motor car designed for one-man operation has recently been put in service on the Berne-Worb Railway in Switzerland. The car was built by the Swiss Industry Company of Neuhausen and the electrical equipment supplied by the Ateliers de Secheron of Geneva. This is designed to operate on 750 volts d.c. and to haul three trail coaches of a total weight of 30 tons at an average speed of 15½ m.p.h. The line is 6 miles in length and has an average gradient of 1.6 per cent, the maximum being 3.6 per cent.

Two electric motors of the four-pole type are provided, each with an hourly capacity at the wheel rims of 75 hp. The ratio of the gearing is 5.42 to 1. The coach measures 43 ft. 4 in. over all, with a wheelbase of 26 ft. 2 in. It has a capacity for 36 seated and sixteen standing passengers. The electrical equipment weighs 7,600 lb. and the body and mechanical equipment 30,400, or a total weight of 19 tons.

Recent Bus Developments

Police Guard Riderless Buses in Buffalo

Railway and City Cold Toward Roseate Dream to Spend $8,000,000 on Mayor's Experiment

Buffalo newspapers are having quite a bit of fun at the expense of Mayor Frank X. Schwab, whose latest roseate dream for the solution of Buffalo's transportation problem is a municipal fund of $8,000,000 with which to finance the purchase and operation of 800 buses, together with garages, service stations and all the paraphernalia that is needed for a successful transportation system in competition with the International Railway and its subsidiary, the International Bus Corporation.

The latest idea of Mayor Schwab does not fall with soothing effect on the ears of the other four statesmen in the City Council. They have been trying unsuccessfully for the last three or four weeks to find out what has become of the $10,000 they appropriated for municipal buses. There has been talk that a taxpayers' action might be started against members of the Council, individually and personally, to collect the funds out of their own respective pockets and place them back in the city treasury. This has made their nights uneasy and their days dreaded for fear of process servers.

So it came to pass that Commissioner John J. Love hastened to the City Hall and announced that he will vote against any further appropriations to continue Mayor Schwab's experimental bus lines and that he will vote against any contracts for the purchase of additional buses.

Commissioner James P. Moore says he will stand by his friend Love in the Council and Commissioner Schwartz is practically certain to join the group. Mr. Love wants it made clear that he is basing his action on an opinion given by the City Law Department to the effect that the courts have held that a municipality cannot legally operate bus lines. The Mayor, however, is emphatic that he is going ahead with his plans even if it might cost the taxpayers the $8,000,000. Says the Mayor:

> Besides placing the control of the transportation system in the hands of the city, where it should be, the bus routes will reduce the number of traffic accidents, because riders will get on and off at the curb instead of being forced to walk to car tracks.
>
> The present two bus lines will be augmented as fast as possible. The International Railway threatened to get an injunction out against me within two days after I started the bus lines, but the lines have been running two months and the railway officials haven't one yet. There are plenty of parallel streets between Buffalo parks, and if they enjoin us from running on one street, we'll move over to the next street.
>
> I am in this fight to a finish. Winter is coming on and I am not going to see the people standing around in slush and zero weather waiting for street cars that don't come. I'm going to provide adequate transportation.

While all this talk is going on the International Railway is watching the municipal buses run up and down the city streets with practically no passengers, but well guarded and protected by city police. This has continued for several months and taxpayers are beginning to wonder what the Mayor's experiment is costing them.

B. J. Yungbluth, president of the railway, says that the minute the City Council approves applications pigeonholed for more than a year additional bus routes will be established to meet the needs of rapidly growing sections of the city. Several new cross-town bus lines are said to be essential.

Co-ordinated Service Extended in Hammond

A new motor coach line, demonstrating the benefit the public receives when motor coach and electric railway service is co-ordinated, was established on Sept. 27 by the Calumet Motor Coach Company in Hammond, Ind.

The service was started to bring the station of the Chicago, South Shore & South Bend Railroad, an allied company in the control of the Midland Utilities Company, closer to the business district of that city.

The schedule has been so arranged that all east and west bound South Shore trains are met by the coaches. The line is about 1 mile long. The fare is 10 cents, but transfers are issued to all other city lines of the Calumet Motor Coach Company.

The South Shore Line is growing increasingly popular with the residents of Hammond and the demand has been insistent for dependable service to and from the local station.

More Bus Lines for Milwaukee

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has applied to the city for permission to install auxiliary bus service on the south side. This line would extend from National Avenue and Twenty-second Avenue south to Forest Home Avenue.

Other Angles to Detroit Jitney Case

The fight against jitney operators in Detroit, Mich., has been renewed by the city's legal department. In answer to a motion filed with the State Supreme Court, asking the dismissal of the stay of proceedings under which the jitneys are now operating, the jitney operators received a ten-day respite.

An opinion of the State Supreme Court, handed down last spring, held that the ordinance barring jitneys was constitutional. Later Judge Bird restored the original injunction issued by Judge Hunt in 1923, which permitted the jitneys to continue. It was argued by the corporation counsel that Justice Bird's order was improperly issued, and it is considered by other justices that the chief question is the right of Justice Bird to issue such an order during the vacation period and without consulting the other members of the court. Justice Bird's order remains in effect while the briefs are being prepared by the attorneys for the two sides.

The corporation counsel argued that the writ issued by the United States Supreme Court was simply an expression of willingness to review the case. Barnard claimed that Justice Bird was within his rights, and contended that the restraining order against the city acts only to keep the issue alive until it is settled in Washington by the United States Supreme Court. It was his further claim that if the order is withdrawn, the jitney organization will be out of existance by the time the United States Court has issued a decree.

In his motion asking dismissal of the stay of proceedings, the assistant corporation counsel pointed out that the primary election on Sept. 14, when the people voted against an amendment to allow jitneys to operate, shows that most voters wish to pursue the course outlined in the city charter and bring all the city transportation agencies under municipal ownership as soon as possible.

It is further cited in the bill that since the original injunction was issued, the city has not been able to exercise even precautionary measures of regulation over the jitneys. The jitneys, it is cited, have obtained a revenue of approximately $1,500,000 from the free use of the streets since 1922 and that the operation of the jitneys has caused a net loss of revenue of about $1,000.000 to the municipal railway. The bill reads:

> If an exclusive franchise were given to a private corporation under the laws and ruling of the court, its rights and property would and must be protected by the court. The city of Detroit, which has invested its taxpayers' money in a transportation system, giving it an exclusive franchise, is entitled to the same protection and even more so, because the money of the public and taxpayers is invested not for pecuniary profit but to serve themselves and the public at large at a cost of operation fare.

The corporation counsel asks that the stay of proceedings be dissolved or that a bond of $1,000,000 be issued to protect the city against any loss by reason of the issuance of the stay, pending the settlement of the case by the United States Supreme Court.

More Puget Sound Bus Lines Purchased

The Park Auto Transportation Company, Tacoma, Wash., a Stone & Webster concern operating bus lines in connection with the interurban electric line between Seattle and Tacoma, has purchased holdings and property of the Northwest Transportation Company, Olympia, which give it bus lines for the continuous trip between Seattle and Portland and from Tacoma to Tenino.

In addition the Puget Sound Electric Railway, also a Stone & Webster concern, has purchased the stage lines of the Northwest Transportation Company between Olympia and Kelso.

Holyoke Bus Argument Reassigned

The Interstate Buses Corporation, filed a brief in the Supreme Court on Oct 4 in its appealed case against the Holyoke Street Railway, Holyoke, Mass., and the case has been reassigned for argument on Oct. 25 before the United States Supreme Court. The bus company, a Connecticut corporation, seeks to have an injunction removed which prevents the operation of its bus line between Hartford, Conn., and Greenfield, Mass., via Springfield, Holyoke, Amherst and smaller towns.

The Holyoke Street Railway alleged illegal operation and declared that the bus company was competing unfairly with the railway in Holyoke. At the same time it stated that passengers were being transported over a route in Massachusetts without the required certificate and licenses.

The bus company applied to the federal court for the District of Massachusetts without success to have subsequent suits of the railway restrained. Meanwhile the court enjoined the Interstate from operating without the necessary licenses. Now the Interstate has appealed to the Circuit Court.

Pasadena-Tierra Alta Line Authorized

A certificate has been granted by the Railroad Commission to Pacific Electric Railway for the operation of motor coaches between Pasadena and Tierra Alta, Cal., over the following lines, North Los Robles Avenue line, North Orange Grove Avenue-Center Street line, North Elmoreno Avenue line, North Hill Avenue line, North Stevenson Avenue line, North Lake Avenue-East Orange Grove Avenue line, California Stret-South Robles-South Raymond Avenue line, South Marengo Avenue-Glen Arm Street line.

Buses to Be Used by Willapa Railway

Buses eventually will be substituted for street cars for the Raymond-South Bend run by the Willapa Electric Company, Raymond, Wash. That is the decision of the State Department of Public Works. Some time ago the company asked for permission to substitute bus service for the railway between Raymond and South Bend. The Ocean Beach Transportation Company had filed a petition for a similar franchise. The Willapa Electric Company replied by asking for a franchise from South Bend to Pt. Ellis in competition with the Ocean Beach Transportation Company. By mutual agreement, it is arranged that the electric company have the South Bend-Raymond franchise and the Ocean Beach Company exclusive right to the South Bend-Pt. Ellis run, with permission to take through passengers to Raymond.

Another Bus Line in Tulsa.—The Oklahoma Union Railway has added a new bus line to its service in Tulsa. The new line starts at 21st Street and Harvard Avenue and extends to Waverly and to Admiral Boulevard.

Will Vote on Five-Cent Bus Line.—Citizens of Forest Hill, Ont., are to have a chance to vote on Oct. 30 on the proposal to make an agreement with the Toronto Transportation Commission, for a bus service through the village. At a special meeting of the Village Council it was decided to put the plan before the electors. The proposal is to have a fifteen-minute service supplied by one bus, at a 5-cent fare, the deficit to be met by the municipality. D. W. Harvey, general manager of the commission, estimates that the deficit may be between $2,500 and $3,500. The round trip could be made in half an hour, it is estimated.

Skip-Stops on Bus Lines.—The Los Angeles Motor Bus Company, a subsidiary of the Los Angeles Railway, Los Angeles, Cal., has received authority to reduce the number of stops on its bus and railway lines. Bus stop signs will be erected on all of the lines and then buses will stop only at such marked stops. Under the new scheme there will be from six to eight stops to the mile. The bus stop signs are triangular in shape, of enameled iron, and read "Bus Stop" in black letters on a yellow background, both sides of the sign being alike. Those used by the Los Angeles Railway read in addition "LARY."

Taxable Bus Operation Filed.—The Connecticut Company recently filed a tax list under protest at Hartford, Conn., to cover 26 buses it operates in that city. This was done by the company to avoid the 10 per cent addition for failure to file the tax. George D. Watrous, general counsel for the company, has stated that in his opinion the company is not subject to taxation of its buses by municipalities. The Hartford board, however, differs and informed the company that should the tax statement not be filed the company would be subject to the usual 10 per cent addition. This is the first year Hartford has included buses in its grand list. The city of Hartford bases the course it has taken on an act approved by the Legislature in 1925.

Bus Service Started in Vandergrift.—Two modern type Yellow coaches were operated recently in Vandergrift by the West Penn Railways, Pittsburgh, Pa. One of these vehicles is to be operated regularly between Vandergrift and North Vandergrift and the other to be kept in reserve to guarantee uninterrupted service and to provide additional capacity when needed. Each bus can accommodate 21 passengers. The service is operated under the name of the "Penn Bus Lines." Buses connect with the Leechburg and Apollo electric cars at North Vandergrift.

Railway Loses on Bus Issue.—The Public Service Commission on Sept. 27 denied the application of the International Railway, Buffalo, N. Y., for a rehearing on the petition of Zenos H. Hill for the transfer of his certificate to the Buffalo Valley Bus Lines, Inc., for the operation of a bus line from the hamlet of North Java to the city of Buffalo. No proof was offered at the hearing upon any question involved in the application which was not already covered by the company in the original petition.

Financial and Corporate

Constructive Decision at Salt Lake

Utah Commission Decries Operation at Continual Loss to Company and Car Rider—Buses Substituted

The Utah Public Utilities Commission recently approved an application of the Utah Light & Traction Company which permits the company to abandon service between Centerville and Salt Lake City and to remove its trackage and other appurtenances. In lieu of the street car service the company is required to substitute buses. The company is planning to furnish a combined service consisting of the street cars to the city limits, which is also a fare limit, and to operate buses from this point to Centerville, 7½ miles from the north limits of Salt Lake.

The Centerville line, extending from the north city limits of Salt Lake City to Centerville, with a terminal in Davis County, parallels the state road or paved highway leading through Davis County to Ogden City, Weber County, Utah. The line was constructed in the year 1912.

The commission ruled that the operating revenues of the line for more than five years past have been insufficient to meet the operating expenses; that for the year 1925 its gross operating receipts were but $21,276, while its operating expenses amounted to $30,688; that the annual average rate of return for five years, from Jan. 1, 1921, to Dec. 31, 1925, based upon the valuation of the applicant's entire railroad system, as fixed by the commission in its order of Jan. 15, 1920, at $8,468,279, was only 2.82 per cent, and that the inventory value of the applicant's Centerville line, as found by the commission, was $180,178. The commission found that the revenue fares carried for 1925 were 347,764, against 324,495 in 1924 and 405,902 in 1923. That the total revenue fares carried on the applicant's entire street car system for the year 1925 was 30.245,423, of which the Centerville line carried 347,764.

It was the belief of the commission that from the salient facts found it was apparent that the Centerville line could no longer continue to operate under existing conditions and circumstances without incurring a loss of approximately $10,000 a year. Further, this loss must be sustained by the applicant, or it must be borne by the car riders of the entire railway system. The commission was convinced from the evidence that the territory served by the Centerville line had been, in a great measure, built up and improved by residents who had faith that the street car line under consideration would remain and serve them as a public utility.

Although counsel for protestants, the commission said, seemed to question the power of the commission to permit the applicant to withdraw its rail service in view of the franchise rights granted to it by Davis County and the city of Bountiful, not yet expired, such right has been repeatedly upheld by the courts of highest authority, both federal and state, when the continuance of a rail service would entail either heavy financial loss on the part of the applicant or else cause a great burden to be borne by the car riders on the entire railway system.

The commission felt, however, that the Utah Light & Traction Company owed something to the communities that had grown up and had developed in faith that the street car line would remain as a permanent convenience to meet their transportation needs. Accordingly the commission felt that the applicant should be permitted to discontinue its Centerville line on the condition that it, either by itself or through some subsidiary corporation, provide automobile bus service over the public paved highways between North Salt Lake and Centerville, including intermediate points, of equal frequency and at the same fares as were now being charged by rail lines. Provision should also be made for auxiliary or supplemental service in the morning and evening to the Val Verda district, as necessity may require. The commission reserved jurisdiction as to the adequacy, frequency and continued necessity of this service pending the trial of schedules offered by the railway.

The commission, however, did not assume to say what the cost of rendering bus service would be, but expected that it would be rendered safe, commodious and efficient, and at the same time would prove reasonably adequate to preclude, in a very large measure, the losses now incurred by rail service.

In conclusion the commission stated that "the conditions herein imposed upon and consented to by applicant are not to be regarded as merely temporary, but to remain permanent to meet the requirements of the communities affected and as the best interests of the general public shall demand." The application of the company was submitted on May 26, 1926.

$5,000,000 Preferred Issue to New Jersey Customers

The Public Service Corporation of New Jersey has announced plans for an offering to customers of $5,000,000 of 6 per cent cumulative preferred stock. Fifty thousand shares of $100 par value will be marketed on Oct. 1, at which time the company will open another customer ownership campaign by selling securities on installments.

The stock will be offered at par and accrued dividends, for cash or at the rate of $10 a share monthly. Interest at the rate of 6 per cent annually will be paid on installments and the purchaser will receive the accrued dividends when he completes his payments. Adjustments for interest will be made when the stock is delivered.

The company in previous campaigns has sold 7 and 8 per cent preferred shares to customers.

Details of Large Merger in Arkansas Practically Complete

The Arkansas Power & Light Company has been incorporated under the laws of Arkansas, with an authorized capital of 1,300,000 shares of common stock, 150,000 shares of $7 preferred stock and 100,000 shares of $6 preferred stock, all without par value. The new corporation is the largest public utility company ever incorporated in Arkansas. It is the intention to merge into this company the present Arkansas Light & Power Company, Arkansas Central Power Company, the Pine Bluff Company and East Arkansas Power & Light Company and other miscellaneous properties. These companies are now controlled by the Electric Power & Light Corporation and the latter company will control the new Arkansas Power & Light Company. The new company, in addition to supplying electric power and light service to a large area of Arkansas, will also supply electric railway service in Pine Bluff and Little Rock.

Stockholders of Arkansas Light & Power Company, Arkansas Central Power Company and the Pine Bluff Company will vote upon the merger at special meetings which it is planned to call soon. Providing the merger is voted upon favorably, holders of the present $7 preferred stock of the Arkansas Light & Power Company, Arkansas Central Power Company and the Pine Bluff Company will have the opportunity to exchange their stock, share for share, for the $7 preferred stock of the new Arkansas Power & Light Company.

Economy Program for Seattle Municipal Railway

Present prospects are that the proposed program of economy for the Seattle Municipal Railway, Seattle, Wash., outlined in the recent report of Clark R. Jackson, superintendent of public utilities, will be put into effect. The citizen's advisory committee, recently appointed by Mayor Bertha K. Landes, has declared its belief that the plan should be tried, and members of the City Council also favor the plan. Mayor Landes, however, said she would take no action until the return of D. W. Henderson, superintendent of railways, who is expected back from the East on Oct. 15.

Mayor Landes says that it will cost not more than $10,000 to make the necessary track changes to put the loop system into effect, whereas the estimated saving is placed at $50,000 a month. It is also estimated that $200,000 more can be saved by a reduction in the power rate and curtailment of services in a number of instances.

Mr. Jackson points out that the railway lost $27,215 on the five bus lines operated in 1924, exclusive of depreciation and interest; $44,012.39 on eight lines in 1923, two of which were operated only a few days, and during the first six months of this year lost $44,012. He said:

> We will soon be operating 33 buses on eleven routes. We own the buses, and it, therefore, seems necessary to operate them. I suggest, however, that a moratorium be declared on further extensions and that the system be adjusted in an attempt to reduce losses on the lines already in operation.

Under the new system it is planned to turn back at Pike Street all cars from the north and east which traverse the retail business district. All cars from the south also would be turned back at that point.

$784,000,000 for Rapid Transit in New York

Investment by the city of New York in rapid transit lines, in round figures, now amounts to more than $320,000,000. The grand total of investment by the city and the railways, including the investments of the latter for equipment and their contribution to the city's cost of construction, amounts to $615,540,000.

This does not include the investments made in the company-owned railroads—the old elevated lines—prior to the signing of the dual contracts on March 19, 1913. These elevated railroads, on the basis of the companies' books, represent original expenditures amounting in round figures to $169,000,000, thus making the cost of the whole rapid transit system of New York about $784,000,000.

The Interborough system of subways and elevated extensions of subways extends from the Bronx, through Manhattan and into Brooklyn and Queens. The Brooklyn company's system extends through Brooklyn, a part of Queens, into Manhattan and again in Queens, where use is shared with the Interborough of two lines in that borough. This dual system for the first time brought both companies into and through the community center of Manhattan, linking up four of the five boroughs of the city, and providing a maximum ride of nearly 17 miles at a 5-cent fare.

CONTRACTS NOS. 1, 2, 3, 4 AND CERTIFICATES RELATED TO CONTRACTS NOS. 3 AND 4

City's and Companies' Investment—June 30, 1925

City's Investment:		
Contracts Nos. 1 and 2............ (a)		$61,000,000
Contract No. 3.........................		103,250,000
Contract No. 4.........................		156,500,000
Total, city..............(Rounded)		$320,750,000
Companies' Investments:		
Interborough Rapid Transit Company:		
Contracts Nos. 1 and 2...........(b)		$46,000,000
Contract No. 3:		
Construction........	$57,821,100	
Equipment.........	48,487,000	
Additions to construction.........	221,000	
Additional equipment	10,061,000	
Total, contract No. 3.............		116,590,000
Certificates for company lines......		44,158,00
Total, I.R.T. Company (Rounded)		$206,748,000
New York Rapid Transit Corporation:		
Contract No. 4 (City lines):		
Construction........	$14,191,000	
Equipment.........	31,184,000	
Additional equipment	2,771,000	
Total, contract No. 4 (city lines)..		$48,146,000
CoWpany lines, contract No. 4, and related certificates.............		39,896,000
Total, New York Rapid Transit Corporation........(Rounded)		$88,042,000
Grand total................(c)		$615,540,000

Notes:—The above figures in city investment include expenditures from proceeds of both corporate stock and revenue bonds:

(a) Does not include $5,500,000 for city's superintendence.

(b) Includes $9,000,000 excess construction cost of contract No. 2.

(c) Does not include any investment in company owned railroads prior to March 19, 1913.

The dual contracts involve a number of financial arrangements other than those which relate merely to construction. The New York Transit Commission is charged with the duty of administering these contracts with the operating companies on behalf of the city. The commission is, in effect, the warden of the city's investment in the company-operated subway lines.

The accompanying tabulation shows the approximate expenditures to June 30, 1925, made by the city and the companies in connection with rapid transit lines. The amounts stated under contracts Nos. 3 and 4 and the related certificates are tentative and subject to the determination of the chief engineer.

Merger Reports at Lincoln

Gossip in financial circles in Lincoln, Neb., points to a possibility of a merger of the Lincoln Traction Company property with that of the Omaha, Lincoln & Beatrice Interurban, but the local officials insist they have no knowledge of any negotiations. The United Light & Power owns the railway system and the Robinson-Musser rubber interests in Akron hold the interurban, which operates between Lincoln and University Place and Lincoln and Bethany, both suburbs, 6 miles distant. The two corporations have got along amicably for years, the interurban buying its current from the other and leasing a portion of its tracks for traction use. The recent application of the interurban for permission to run buses that would tap the downtown district from which the traction company gets the cream of its traffic brought a protest from the latter. This collision of interests is believed to be responsible for the story that the compromise negotiations include a possibility of sale and purchase.

Purchaser Wanted for Ohio Road

Charles W. Eliff, attorney for the receivers of the Dayton, Covington & Piqua Traction Company, West Milton, Ohio, has announced that the line will be discontinued on Nov. 6. Judge Smith Hickenlooper has approved the petition of the receivers to discontinue service if there is not a purchaser before Nov. 6.

Permission to abandon the line was originally granted to receivers by the Ohio Public Utilities Commission on Nov. 28, 1925, but the line was kept in operation in the hope of finding a purchaser for it as a going concern. A sale was advertised to be held Feb. 13, 1926, but there was no bidder for the property. Moreover, there has been no organized response to attempts to interest groups of people served by the line in the purchase of the property. The company operates more than 30 miles of line.

More Passengers in Baltimore.—For the first eight months of this year the United Railways & Electric Company, Baltimore, Md., carried 148,870,529 passengers, against 148,298,370 for the similar period last year. For the first six months of 1926 and 1925 the passenger figures were 113,715,254 and 112,761,063 respectively.

Revenues Increase.—Total revenue of the Community Traction Company, Toledo, Ohio, in September was $258,919, compared with $255,550 for a similar month last year. The increase is in spite of open weather and is credited in part to improvements in service and the popularity of chartered bus service started Sept. 1.

Would Reduce Service.—The Cincinnati Street Railway, Cincinnati, Ohio, has petitioned the State Public Utilities Commission for permission to abandon the operation of the Bond Hill line during the major portion of the day. The company in its application proposed that four cars only be operated during morning and evening rush hours. The reason given for the application was that the line had been operated at a loss during the day; that Bond Hill was served by a bus line operated by the company, and that the car line did not actually reach the suburb. E. D. Gilman, Director of Public Utilities, will take the application under advisement.

Fights Higher Assessment. — The Washington, Baltimore & Annapolis Electric Railroad, with headquarters in Baltimore, Md., has filed a protest with the Appeal Tax Court of the city against an increase of more than $150,000 in the assessment against the company's property. In 1926 the assessment was $253,745, covering rights-of-way, tracks and bridges in the city. The assessors have proposed that the assessment for 1927 be $413,620.

Hearing on Petition Postponed.—The Public Service Commission recently announced that the hearing scheduled for Oct. 19 on the petition of the Hudson Valley Railway, Glens Falls, N. Y., for approval of the abandonment of its Lake George-Warrensburg line had been further postponed to Oct. 26 at Albany. At the same time the commission will hear the petition for abandonment of the company's Thomson-Greenwich line.

Service Discontinued.—The Depew & Lancaster Railway Corporation, Buffalo, N. Y., which operates between Buffalo city line at East Genesee Street and the villages of Depew and Lancaster, discontinued service on Sept. 23. R. C. Lenahan of Lenahan & Sons of Buffalo, who purchased the property at a bondholders' foreclosure sale five years ago, says he will scrap the line. The company has operated two cars, but the income was not sufficient to pay operating expenses.

Wind Up Railway's Affairs. — The sum of $7,425 will be distributed to the holders of the $102,323 in bonds of the defunct Phoenixville, Valley Forge & Strafford Electric Railway, Phoenixville, Pa. The filing of the auditor's report shows that there will be a dividend of 0.07256 per cent on all that remains of the line built and operated for the first time in 1911. The road was built by Thomas E. O'Connell, then residing in Phoenixville, who also sold most of the bonds. In 1923 only one car was in operation on the line between Phoenixville and Spring City. In the year 1922 receivers were appointed. The line operated 5 miles.

Seeks More Money for Audits.—Increased appropriations will be asked by the Missouri Public Service Commission of the next Legislature which meets in January to finance audits of the accounts and physical properties of various public utilities throughout the State to determine reasonableness of existing and increased rates. The commission will ask for $453,300, compared with $301,200 for 1925 and 1926. The appropriation will be for two years.

Would Refund $844,500 Bonds.—The Interstate Public Service Company, Indianapolis, Ind., has presented to the Indiana Public Service Commission a request for authority to refund $844,500 of bonds of the Indianapolis & Louisville Traction Company. This is the balance of underlying bonds not refunded, it was explained. To care for the refunding, the Interstate seeks to issue the same amount in first mortgage refunding bonds to be sold at not less than 90 per cent of par. The company also seeks to sell $99,300 of its 6 per cent preferred stock.

Route Change Proposed.—The Washington Railway & Electric Company, Washington, D. C., has requested permission to abandon the Portland Street line from Nichols Avenue to the old steel plant in Anacostia. A public hearing will be held on the petition.

Will Vote on Stock Increase. — A special meeting of the stockholders of the Chicago Rapid Transit Company, Chicago, Ill., has been called by the board of directors, to be held on Dec. 9, for the purpose of considering and voting upon the question of increasing the company's capital stock from $25,330,500 to $30,330,500, such increase to be prior preferred stock. Customers of the company and employees are now large holders of this class of stock of the company under the stimulus of a passenger partnership campaign conducted several years ago.

Hears Track Removal Petition.—The Pennsylvania Public Service Commission heard on Sept. 22 the application of the Philadelphia Rapid Transit Company, Philadelphia, for permission to remove tracks on Catherine Street between Eighth and Ninth Streets and a curve at Ninth and Spring Garden Streets. C. C. Schaffer, traffic engineer of the company, said that these tracks have not been in use since 1913, when there was a rerouting of various lines. He said the company would remove the tracks as soon as the city was ready to repave these thoroughfares.

Would Abandon Unprofitable Sections.—The New York & Stamford Railway, Port Chester, N. Y., petitioned the Public Service Commission on Sept. 30 for approval of a declaration of abandonment of that part of its route on Westchester Avenue, South Regent Street and North Regent Street in New Rochelle. The petition alleged that these parts of its system were no longer necessary for the successful operation of the road or the convenience of the public.

Personal Items

Messrs. Knecht and Dubee Advanced

Careers Reviewed of Grand Rapids Railway Officials Recently Promoted Following Retirement of J. C. Madigan

Both John W. Knecht and S. W. Dubee have been promoted recently by the Grand Rapids Railway, Grand Rapids, Mich., as a result of the retirement of J. C. Madigan as superintendent. As noted briefly in the ELECTRIC RAILWAY JOURNAL for Sept. 4 Mr. Knecht succeeds Mr. Madigan and Mr. Dubee succeeds to the post made vacant by the advancement of Mr. Knecht.

J. W. Knecht

Mr. Knecht, new general superintendent, was born in Grand Rapids in 1888. He attended public schools there and was graduated from the Central High School in 1905. His first job was as a cash boy in a dry goods store during summer vacations. He also was messenger boy and news boy during vacations.

After graduating, Mr. Knecht worked for one year for the Pennsylvania Railroad (then the G. R. & I.). He entered Michigan State College in 1906, and was graduated in 1910 with an engineering degree.

S. W. Dubee

During college vacations he worked for the Grand Rapids Railway as draftsman. In 1911 he entered the employ of the company as assistant engineer and remained in this capacity until 1917, when he removed to Washington and entered the Bureau of Construction and Repair, Navy Department, serving under Rear Admiral Taylor. At the close of the war Mr. Knecht returned to the Grand Rapids Railway in the position of chief engineer, a post he held until he was appointed general superintendent.

Mr. Dubee has acted as assistant to Mr. Knecht in his former capacity of chief engineer. Mr. Dubee was born in Grand Haven, Mich., on July 9, 1894. He attended prep school at Beloit Academy in Wisconsin and spent two years in college at the same place. He attended the University of Michigan for three years and was graduated as a civil engineer. He then sold building material for a year.

At Camp Pike, Little Rock, Ark., Mr. Dubee was one of the five division engineers on construction. As a lieutenant in the Ordnance Department, he served a year and a half in the army, at Plant No. 1, Muscle Shoals.

After the war Mr. Dubee became superintendent of construction for the Fairbanks, Morse & Company plant at Beloit, Wis. He next spent a year and a half on public utilities valuation work for the state of Michigan and a year on special development and research work on certain automotive lines. He entered the employ of the Grand Rapids Railway on Nov. 1, 1925.

J. H. Alexander Made President of Cleveland Railway

Joseph H. Alexander was elected president of the Cleveland Railway, Cleveland, Ohio, at a meeting of the board of directors on Friday morning, Oct. 15, to succeed the late John J. Stanley. At the same meeting Ralph W. Emerson was elected vice-president and Paul E. Wilson was made vice-president and secretary. Mr. Alexander was formerly vice-president, Mr. Emerson general manager and Mr. Wilson secretary.

Burt Hamerstrom Heads New San Francisco Department

Working directly under the supervision of Samuel Kahn, executive vice-president of the Market Street Railway, San Francisco, Cal., a commercial department has been established.

Burt Hamerstrom has been appointed manager of the new department and charged with duties attaching to new business effort, public relations and advertising. As an initial step toward establishing closer relations with the public, space is being used in the metropolitan newspapers to acquaint the people with the company's service.

Mr. Hamerstrom spent about ten years as a newpaper reporter and feature writer in San Francisco, Chicago and Seattle. For more than ten years he has been associated with public utilities, with the United Gas Improvement Company and Welsbach Company in Philadelphia and with the North American Light & Power Company—Illinois Power & Light Company—in Chicago, where he helped to direct the commercial, customer-ownership, public relations and advertising activities for properties in more than one hundred communities in several states.

William Petersen Made South Shore Traffic Head

William Petersen has been appointed traffic manager of the Chicago, South Shore & South Bend Railroad, Michigan City, Ind. Mr. Petersen has been assistant general passenger agent of the line with offices at Chicago. For several years previous to joining the South Shore Line organization he was general agent in the passenger department of the Chicago, North Shore & Milwaukee Railroad.

The new traffic manager has spent twenty years in various capacities of the railroad business, beginning in 1906 as a relief telegraph operator and later relief ticket agent with the Chicago & Alton Railroad. Later he served as auditor at the Chicago Union Station and also as assistant ticket agent. In 1915 he took charge of the traffic department of the Pullman Car & Manufacturing Corporation, and after serving with that company for four years became a traveling freight and passenger agent with the Southern Pacific Railroad.

John N. Cadby, executive secretary of the Wisconsin Utilities Association, has been named acting secretary of the Wisconsin Motor Coach Association following the resignation of Philip Litman, now connected with the Mohawk Stage Line, Davenport, Iowa. Mr. Cadby will handle the affairs of the association pending the selection of a permanent secretary at the association's annual convention in Madison on Nov. 9 and 10.

William W. O'Toole New Auditor of North Shore Line

William W. O'Toole has been appointed auditor of the Chicago, North Shore & Milwaukee Railroad, the North Shore Line, Chicago, Ill., succeeding Charles R. Mahan, whose promotion to comptroller was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 2, page 597. Mr. O'Toole entered the service of transportation organizations under the management of Samuel Insull and associates on March 1, 1914, when he joined the Chicago Elevated Lines as an employee in the payroll division of the general accounting department. He occupied various positions pertaining to payrolls and later was in charge of all labor distributions. Transferred to the general accounting division, Mr. O'Toole handled the abstracts of the auditor's entries, vouchers, bills and journal entries for the Metropolitan West Side Elevated Railway, the Northwestern Elevated Railroad and the South Side Elevated Railroad. He was later transferred to the voucher division in charge of all vouchers, bills and journal entries, also serving as assistant to the chief clerk.

In April, 1920, T. B. MacRae, auditor of the Elevated Lines, was elected auditor of the Chicago & Interurban Traction Company, and Mr. O'Toole was appointed assistant auditor, serving in this capacity until July 22, 1921, when he was elected auditor. Mr. O'Toole remained in this position until Aug. 1, 1924, when he was appointed assistant auditor of the North Shore Line under Mr. Mahan. This position he held until his recent promotion.

W. W. O'Toole

Obituary

Simon Bamberger

Simon Bamberger, chairman of the board of the Bamberger Electric Railroad, died at his home in Salt Lake City, Utah, on Oct. 6, after an illness of less than 24 hours. The cause of his death was acute indigestion.

For many years Mr. Bamberger had been a prominent figure in the development of the West. He was born in Darmstadt, Germany, on Feb. 27, 1845. At an early age he came to America, first locating in Cincinnati, where he secured employment as pin boy in a bowling alley. He utilized every available moment to study English through the medium of books and newspapers. In his early manhood he, with his brother, established a small wholesale mercantile business in St. Louis. He later moved westward, engaged in the mining business at various locations, and finally settled in Salt Lake City, where he became interested in hotel ownership and mining.

In the early '90s he founded what was then known as the Great Salt Lake & Hot Springs Railway, a steam road. This road was completed into Ogden in 1908, and two years later was electrified. It is now known as the Bamberger Electric Railroad, a name adopted on Aug. 14, 1917.

In 1916 Mr. Bamberger was elected Governor of Utah, on the Democratic ticket. He served in this capacity for a period of four years. Under the leadership of Governor Bamberger Utah was in the front rank of the states in war work.

Mr. Bamberger was prominently identified with numerous business enterprises in Salt Lake City and the intermountain territory. Among them were the Bamberger Electric Railway, the projected Bamberger lines into the Uintah Basin, the Bamberger Coal Company and the operation of various mining enterprises. Despite his advanced age, he was very active in attending to business affairs almost up to the time of his death.

Z. E. Knapp

Z. E. Knapp, director of construction to the London Underground Electric Railways, died on Oct. 1 at the age of 59. When the great development of these railways was beginning, Mr. Knapp came to London from America in 1901. After being manager of the London United Tramways, he became in 1913 chief engineer of the underground railways. In 1915 he was appointed manager for maintenance and construction. In 1917 and 1918 he was general manager of Associated Equipment Company, the builders of buses for the London General Omnibus Company. At the end of 1918 he resumed his position on the underground railways. Three years later he was appointed director of construction, and was in charge of the extension of the London Electric Railway from Golder's Green to Edgware, the enlargement of the tunnels of the City & South London Railway, and the extension of the line to Morden.

E. W. Bowman, supervisor of insurance of the Philadelphia Rapid Transit Company, Philadelphia, Pa., and associated with Mitten Management properties for more than 30 years, died recently in Philadelphia. Mr. Bowman was 79 years old.

Charles S. Butts, engineer in the Department of Public Utilities for the city of St. Louis, Mo., for fifteen years, died on Sept. 21. In recent years he had been in charge of the railway operated by the City Water Works Department connecting Baden, the chain of Rocks water work stations and the Municipal Bridge and Dock.

Thomas A. Cole, former claim agent for the Los Angeles Railway, Los Angeles, Cal., died on Sept. 25. He first served as a conductor under J. C. Robinson, superintendent. When the cable lines were opened he was made inspector or supervisor and he held this position until 1896, when he was taken into the office as a clerk, where he worked mostly in the claims. After a year or two he was made regular claim investigator and adjuster and until he retired from the company in 1919 he acted as claim agent.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Guests of Lorain Steel

Mysteries of Steel Rail Making Are Mysteries No Longer to Railway Men Who Visited Plant Recently

It was indeed an interesting occasion out at Lorain, Ohio, on Friday afternoon of convention week in Cleveland. About 125 railway men accepted the invitation of the Lorain Steel Company to inspect its rail mill at the plant of the National Tube Company. The visitors were gathered up in special buses down at the convention hall just as the bell sounded the deathknell of the 45th annual convention. Transported to Lorain by means of a special train, the party enjoyed a tasteful buffet luncheon while en route. S. Cotsworth of the Lorain company played the genial host.

Upon reaching Lorain the assemblage detrained and began a walk through the plant, which consumed an hour and fifty minutes of time and showed practically every phase of the highly interesting manufacture of girder rails, and which gave more than a touch of romance to the frequently taken-for-granted trackwork. They saw the iron ore and limestone being unloaded from barges by means of huge hoists and traveling cranes. They saw the blast furnaces charged and, later, tapped. They saw the ladles of molten iron taken to the open hearth furnaces and there transformed to steel. Then came the rolling of the rails, the seemingly interminable back and forth through the rolls, the cooling, the straightening and finally the various orders marked and piled together for shipment. All of these processes and more were witnessed by the guests in the brief period of their walk through the plant.

The trip was possessing of much interest. More than this, it had the unusual feature of being run through on clock-work schedule. The guests of the Lorain company left the public auditorium at the appointed time and they were returned to their hotels at the hour which had been promised. Credit for much of this must go to W. L. Schaeffer of the National Tube Company, who arranged the trip.

$62,500 Improvement Plan in Toledo

Installation of a new grand union at Summit and Cherry Streets, the busiest intersection in Toledo, was started at midnight, Oct. 14, and for a month will be the cause of probably the greatest rerouting and diversion of all kinds of traffic in the history of the city. The corner is at the busiest end of the Cherry Street bridge on the main Cleveland-Buffalo highway, the only crossing of the Maumee River for several interurban lines. Seven city traction and bus lines and seven interurban lines will have to be rerouted for the installation.

The new special work built by the Cleveland Frog & Crossing Company weighs 235,000 lb. and is the largest of its kind ever turned out by the company. It will provide full clearance curves in all directions with standard 8-ft. devil-strip in place of the 8-ft. and 10-ft. combined at that corner at the present time. New track will be laid for one block on Cherry Street while the crossing is being installed. All joints in the new grand union are welded. The work is expected to cost $62,500 complete.

George Westinghouse Memorial Committee Appointed

A committee chosen from among executives of the Westinghouse corporations has been named to represent the enterprises founded by George Westinghouse in the work of erecting a memorial to him in Schenley Park, Pittsburgh, Pa., to perpetuate esteem for his life and work.

The committee consists of A. L. Humphreys, president of the Westinghouse Airbrake Company, chairman; E. M. Herr, president of the Westinghouse Electric & Manufacturing Company; F. A. Merrick, vice-president of the Westinghouse Electric & Manufacturing Company, and John F. Miller of the Westinghouse Airbrake Company, vice-chairman.

A shaded hillside near Panther Hollow in Schenley Park is to be the site for the memorial which will bear witness to the achievements of the man regarded as one of the most unique personalities and typical figures in the industrial life of his time.

General Electric Orders Increase for Third Quarter

Orders received by the General Electric Company for the three months ending Sept. 30, 1926, total $81,587,917, compared with $73,561,483 for the same quarter in 1925, an increase of 11 per cent, Gerard Swope, president, has announced. For the nine months of the present year, orders total $246,993,637, compared with $223,876,711 for the first nine months of 1925, an increase of 10 per cent.

Long Island Railroad Will Place Large Order for Rolling Stock

At a meeting on Oct. 7 of the board of directors of the Long Island Railroad authorization for the purchase of additional equipment for passenger and freight operations to cost approximately $3,300,000 was made.

This expenditure calls in part for the acquisition of 90 passenger coaches to be used in electric train service. Sixty of these will be equipped with motors and the remaining 30 will be of the trailer type. Contracts for the construction of the new cars will be let shortly. When delivered, early next year, the Long Island Railroad will have 1,189 all-steel passenger cars in service, as compared with 157 wooden cars, this being in line with the company's policy to retire gradually from passenger service all cars of wooden construction. The new passenger cars for electric and steam service will provide seats for about 8,000 persons and enable the company to build up to a maximum of eleven cars trains now operating with an overload.

Among the new freight equipment which will be purchased under the authority just given by the directors there will be three oil-electric locomotives. One of these units, similar to the three about to be ordered, has been in service on the Long Island lines since its delivery last December and has quite fulfilled the expectations of the railway officials.

Oil-Electric and Storage Battery Locomotives for C. & N. W.

A second oil-electric locomotive, similar in specifications to one ordered earlier in the year, was placed in service in the switching terminal of the Chicago & Northwestern Railroad at Chicago on Sept. 23. With the use of this locomotive all engine smoke on the north side of the Chicago River east of Wabash Avenue will be eliminated. The first oil-electric engine in this district has supplanted two steam locomotives and the new one just obtained will be substituted for the remaining steam locomotives used.

The railroad is also arranging for a try-out of a storage battery locomotive. Though equipped with an electric battery system, this type can also be used on an overhead trolley system, through the use of a pantograph. Such locomotives will be particularly useful in switching service over sidetracks branching out from tracks provided with overhead trolley and where the latter system does not extend. The storage battery locomotive would be available on the city's lake front in connection with the recently completed Illinois Central Railroad's electrified system.

Thirty Years of Steady Growth in Subdrainage Practice

"An Anniversary of Significance" is the title of a booklet published by the Armco Culvert & Flume Manufacturers Association of Middletown, Ohio, commemorating its 30th year of service in the fields of drainage and irrigation. The invention of the corrugated iron culvert, which was made in a small Middle Western community back in 1896, had a far-reaching influence in the development of culvert construction. The little booklet just issued tells in very interesting fashion of the most important events in the history of the corrugated culvert and the growth of this new industry. Of particular importance was the development in 1901 of a metal which would effectively resist corrosion and at the same time stand up under the exacting conditions of service. This metal is well known as Armco ingot iron.

In 1906 the American Rolling Mill Company, which had developed this special iron, joined with the manufacturers of the corrugated culvert and the Armco Culvert & Flume Manufacturers Association came into existence. Formerly the attention of this association was devoted largely to manufacturing problems. Today it is actively engaged in research and educational work.

At the conclusion of the booklet comes a summing up of the various fields into which the use of corrugated culverts has been projected and a description of the most recent developments, including the use of perforated pipe for subdrainage by railways and in other fields.

Builders of Cleveland Exhibit Hall Get New Contract

A contract for the construction of a $160,000 carhouse and office structure for the Williamsport Passenger Railway at Williamsport, Pa., has been awarded to the H. K. Ferguson Company of Cleveland, Ohio, engineers and builders. The Ferguson company has recently attracted nation-wide attention in the electric railway field because of the efficient manner in which it has accomplished erection of the large exhibit hall which was used for the A.E.R.A. convention, Oct. 4 to 8.

The new building for the Williamsport Railway is to be one story, approximately 171 ft. x 261 ft., with a side aisle approximately 31 ft. x 132 ft. The front portion of the structure, 50 ft. x 139 ft., will be two stories in height and will be used for offices. Structural steel frame, concrete floors, with inspection and repair pits, cement tile roof and walls of brick and steel sash are features of the structure. It is said that the building will constitute one of the most attractive buildings of its sort and size in the country.

Rolling Stock

Dominion Power & Transmission Company, Hamilton, Ont., will place orders by Nov. 15 for 24 new cars for the Hamilton Street Railway.

Aronimink Transportation Company, bus operating subsidiary of the Philadelphia & West Chester Traction Company, Upper Darby, Pa., has ordered three six-cylinder street-car type buses from the Fageol Company, Kent, Ohio. These were equipped with Westinghouse air brakes.

Community Traction Company, Toledo, Ohio, will equip its cars with leather-upholstered seats in one of the first big moves toward complete modernization of the equipment, it was announced by James A. Greig, sales manager of the company. At a cost of approximately $50,000 the seats will be provided on 127 cars. Work is already in progress at the Central Avenue shops of the company, but as yet none of the cars has made its appearance on the streets. Possibilities of further additions to equipment may hinge on the reception the public gives to the newly furnished cars.

Seattle Municipal Street Railway will ask for bids from auto body building plants for the contract to construct bus bodies on four chassis recently purchased by the department. It is estimated that the bodies will cost approximately $9,700.

Track and Line

Washington Railway & Electric Company, Washington, D. C., has asked permission of the Public Utilities Commission to lay tracks in B Street between Ninth and Fourteenth Streets, N.W., to be operated by underground conduit.

San Mateo, Cal.—The construction of a car line between San Mateo and Palo Alto to serve as a feeder to its Santa Clara County transit system was suggested to the Southern Pacific Company recently by the Menlo Park Chamber of Commerce. This proposed 13-mile link would give continuous service from San José to San Francisco in connection with the present San Mateo interurban line of the Market Street Railway.

Los Angeles Railway, Los Angeles, Cal., has completed changes in overhead work on Glassell Avenue line. The maintenance-of-way department is now shifting the double tracks from 15 to 11 ft. centers. As soon as this is completed the company will construct concrete curbs along the right-of-way and concrete passenger landings. The company is renewing the special work and curves at the junction of North Broadway and Pasadena Avenue near the east end of the North Broadway bridge.

Worcester Consolidated Street Railway, Worcester, Mass., has completed the reconstruction of 344 ft. of double track on Salisbury Street between Highland Street and Armory Square at a cost of $7,500. The old rail was replaced with new 7-in., 103-lb. girder rail and the old wooden blocks were replaced with granite blocks. The company is relocating and changing the grade of track on Grafton Street between Hyannis Place and the city line in connection with the widening of the street on the part of the city. This work will cost about $25,000.

Metal, Coal and Material Prices

Metals—New York	Oct. 13, 1926
Copper, electrolytic, cents pr lb.	14.15
Copper wire, cents per lb.	16.25
Lead, cents per lb.	8.35
Zinc, cents per lb.	7.65
Tin, Straits, cents per lb.	70.00
Bituminous coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.00
Somerset mine run, Boston, net tons	2.00
Pittsburgh mine run, Pittsburgh, net tons	2.075
Franklin, Ill., screenings, Chicago, net tons	1.525
Central, Ill., screenings, Chicago, net tons	1.40
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.75
Weatherproof wire base, N. Y., cents per lb	17.75
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.20
White lead in oil (100-lb keg), N. Y., cents per lb.	15.25
Turpentine (bbl. lots), N. Y., per gal.	$0.925

Power Houses, Shops and Buildings

Petaluma & Santa Rosa Railroad, Petaluma, Cal., is planning the immediate construction of a reinforced concrete passenger station, depot and freight warehouse in Santa Rosa, to cost approximately $35,000. The structure will be of Mission style of architecture with 175 ft. frontage on Fourth Street and 300 ft. on Wilson Street, occupying the entire block between Fourth and Third Streets. It will be of reinforced concrete and steel, replacing the present wooden structure.

Pine Bluff Company, Pine Bluff, Ark., and the Arkansas Light & Power Company, it is rumored, will erect an office building next year. New York architects are said to be drawing plans for the building, which is to be constructed in Pine Bluff. The plan would be to use it as general headquarters for the firm.

Montreal Tramways, Montreal, Que., has started the construction of a new terminal station at Cartierville. The fireproof building is brick exterior and will be heated during the cold weather. The work will be completed about Nov. 1.

Trade Notes

Chicago Pneumatic Tool Company will construct a new plant at Franklin, Ill., for the manufacture of Diesel engines, it is reported. Charles M. Schwab, a director of the Chicago company; H. A. Jackson, president, and W. H. Callan, vice-president, recently visited the site. Several hundred men will be employed in this plant, which is understood to entail an expenditure of approximately half a million dollars.

Walter H. Jones has been appointed engineer of the Auto Body Company of Lansing, Mich. Mr. Jones has had wide experience in the design and construction of bodies, both in this country and in England.

John C. Dolph Company, Newark, N. J., specialists in insulation materials, had treated several motors on the ill-fated submarine S-51 with waterproof varnish. These motors withstood the action of sea water in addition to 58 lb. pressure over a period of 9½ months. After being washed and dried the motors operated normally in every respect, it was stated.

New Advertising Literature

National Safety Council, Chicago, Ill., has published a directory of manufacturers and dealers furnishing equipment, service and supplies for accident and fire prevention, health, sanitation and industrial welfare generally. The title of the booklet is "A Buyer's Guide for the Safety Man."

Ohio Brass Company, Mansfield, Ohio, has issued a leaflet describing the principal features and advantages of O-B trolley catchers and O-B trolley retrievers.

The Peacock Staffless

—also on the Modern cars of

Canada's Largest Traction Line!

The fifty new single end operation cars now being placed in service by the Montreal Tramways, Montreal, Canada, are equipped with

Peacock Staffless Brakes

These cars, containing special provisions for operating in very cold weather, are of the one-man, two-man type and the last word in modern equipment in the Dominion.

Modern car design demands the Peacock Brake because of minimum platform space occupation; simplicity of operation, low installation and maintenance costs, and tremendous braking power.

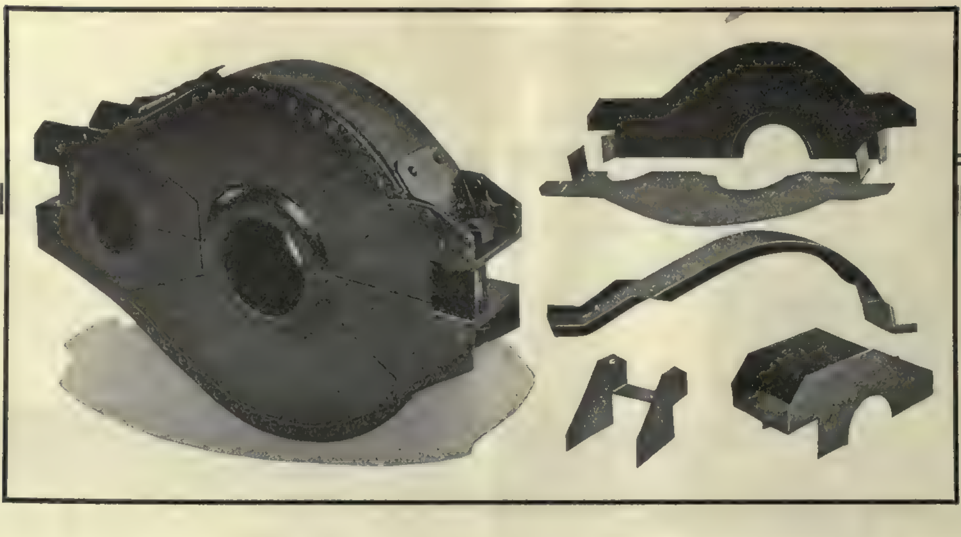
Note in the lower photograph the comfortable leather covered revolving motorman's seat with the Peacock Staffless at the left. It is entirely out of the way of entering passengers.

Write for facts and figures of past performance and installation estimates on your requirements.

National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:
Lyman Tube & Supply Company, Limited, Montreal, Canada



Light, Durable and Strong

YOU can put an end to gear case troubles without adding an unnecessary weight to your equipment.

Columbia Steel Gear Cases are *light* in weight. They are, however, so strongly reinforced at points where the strain is greatest that they "stand up" in service year after year.

At the point where the channel-shaped suspension brackets are riveted on, for instance, there are three thicknesses of metal—a construction that is proof against both road shocks and vibration.

Columbia Malleable Iron Gear Cases are made in the same general design as our steel cases and can be furnished for all types of motors.

We will be glad to furnish you with any further information you may wish or to quote you prices at this time.

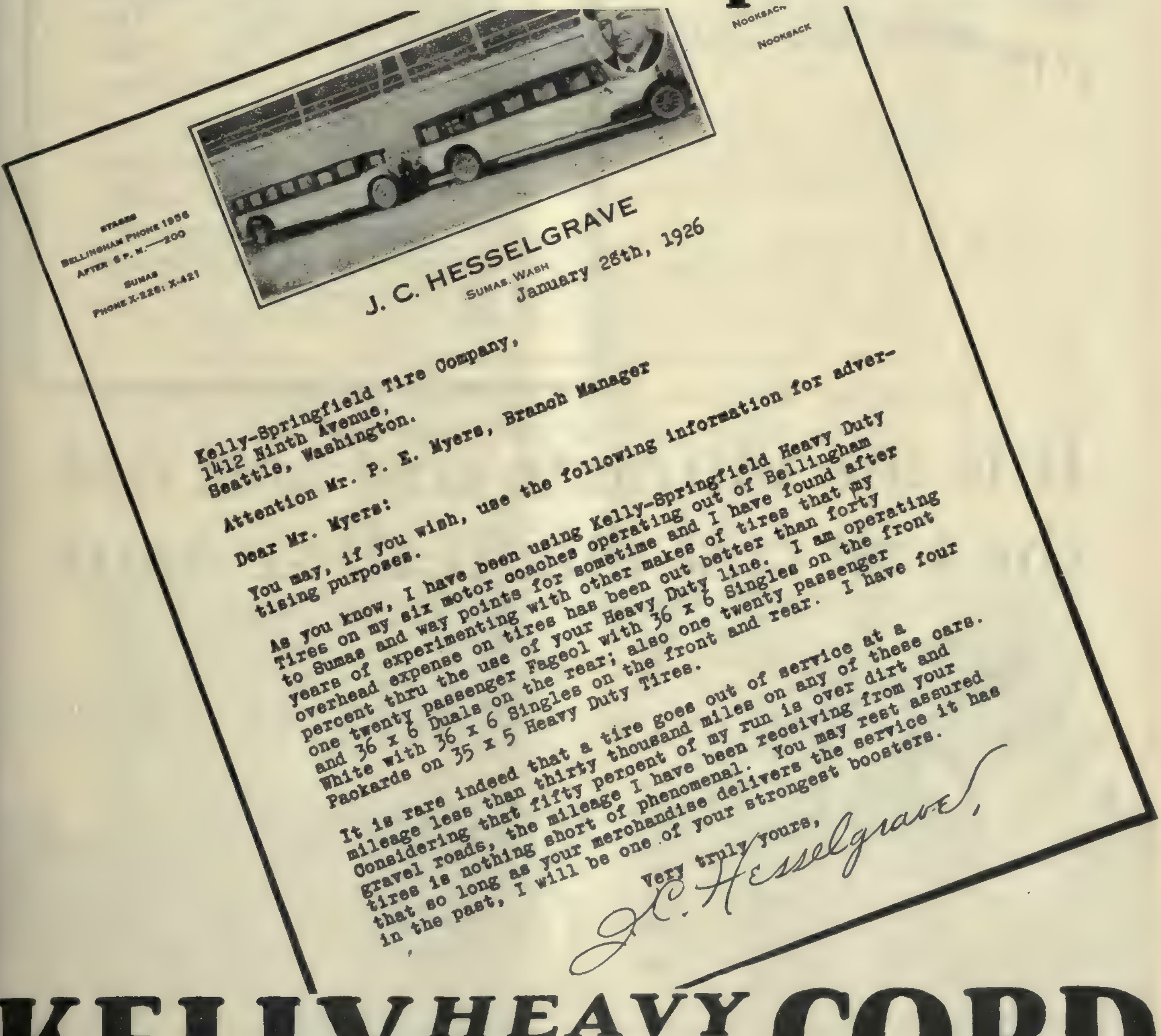
COLUMBIA 1892 MACHINE WORKS

The

COLUMBIA MACHINE WORKS & M. I. CO.

265 Chestnut St., corner Atlantic Ave. Brooklyn, N. Y.

Kellys cut his overhead better than 40 percent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STAGES
BELLINGHAM PHONE 1956
AFTER 6 P. M.—200
SUMAS
PHONE X-226; X-421

J. C. HESSELGRAVE
SUMAS, WASH

January 28th, 1926

Kelly-Springfield Tire Company,
1412 Ninth Avenue,
Seattle, Washington.

Attention Mr. P. E. Myers, Branch Manager

Dear Mr. Myers:

You may, if you wish, use the following information for advertising purposes.

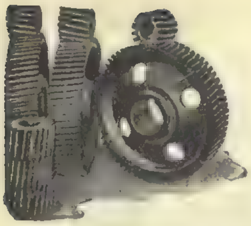
As you know, I have been using Kelly-Springfield Heavy Duty Tires on my six motor coaches operating out of Bellingham to Sumas and way points for sometime and I have found after years of experimenting with other makes of tires that my overhead expense on tires has been cut better than forty percent thru the use of your Heavy Duty line. I am operating one twenty passenger Fageol with 36 x 6 Singles on the front and 36 x 6 Duals on the rear; also one twenty passenger White with 36 x 6 Singles on the front and rear. I have four Packards on 35 x 5 Heavy Duty Tires.

It is rare indeed that a tire goes out of service at a mileage less than thirty thousand miles on any of these cars. Considering that fifty percent of my run is over dirt and gravel roads, the mileage I have been receiving from your tires is nothing short of phenomenal. You may rest assured that so long as your merchandise delivers the service it has in the past, I will be one of your strongest boosters.

Very truly yours,

J. C. Hesselgrave,

KELLY *HEAVY DUTY* CORD



8⅓c. vs. 11½c.

Per 1,000 car miles for pinion costs!

The Superintendent of Equipment on a well-known property reported:

> "We ran very careful tests of 'Tool Steel' Pinions vs. Special Quenched Pinions, following our tests with micrometer measurements and figured our cost per 1,000 car miles based on the relative cost and relative life of the two grades. The 'Tool Steel' showed 8 1/3c. while the competitive grade was 11½c. This accounts for the fact that we have bought so many 'Tool Steel' gears and pinions since that time.
>
> "I might say that we have since been following these tests and the opinions which we formed when the tests were conducted are working out very close to our predictions."

It is the ultimate cost and not the first cost that really counts

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio

FISK
TRANSPORTATION
"Fillerless"
CORD TIRES

Time to Re-tire
Get a FISK
TRADE MARK REG. U. S. PAT. OFF.

Very Satisfactory

The great fleet of busses operated by the Worcester Consolidated Street Railway Co., Worcester, Mass., is equipped with Fisk Transportation "Fillerless" Cords which are proving very satisfactory.

This is one more example of the part that Fisk Transportation Cords are playing in successful bus operation. Today these great Cords are standard equipment on large bus fleets in every part of the country.

Fisk Transportation Cords are proving satisfactory from every standpoint—they produce maximum mileage and passengers praise them because of their extra comfortable riding qualities.

The Fisk Tire Company, Inc.
Chicopee Falls, Mass.

Motor
Protection

Misfit brushes are a constant source of trouble and expense. Protect the operating efficiency and life of your motors with brushes of the correct material, shape and size. U. S. G. Brushes are built to meet your requirements exactly.

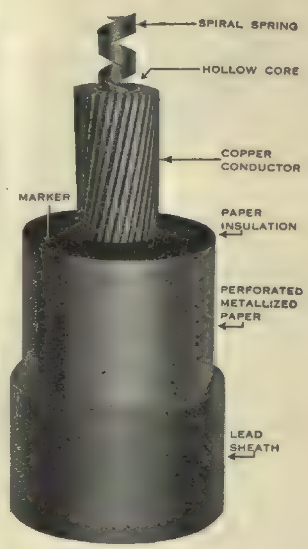
Write for the new Brush Catalog. Just off the press

USG

The United States Graphite Co.
Saginaw, Michigan
New York Philadelphia Pittsburgh Chicago
St. Louis San Francisco

Motor and Generator
BRUSHES

Something New
in Electric Cables



75KV TYPE H CABLE

Note the perforated, metallized paper over the insulation. This prevents ionization in gaps that may exist between insulation and lead.

Type H Cable

is winning recognition among large cable users on account of its dependability.

The Commonwealth Edison Co., Chicago, and Duquesne Light Co., Pittsburgh, have installed 75,000-volt, single conductor Type H.

A line to our nearest office will bring complete information

Standard Underground Cable Co.
Boston Washington Chicago Kansas City
New York Atlanta Detroit Seattle Philadelphia
Pittsburgh St. Louis Los Angeles San Francisco
For Canada: Standard Underground Cable Co.
of Canada, Limited, Hamilton, Ont.

TRIBLOC CHAIN HOISTS

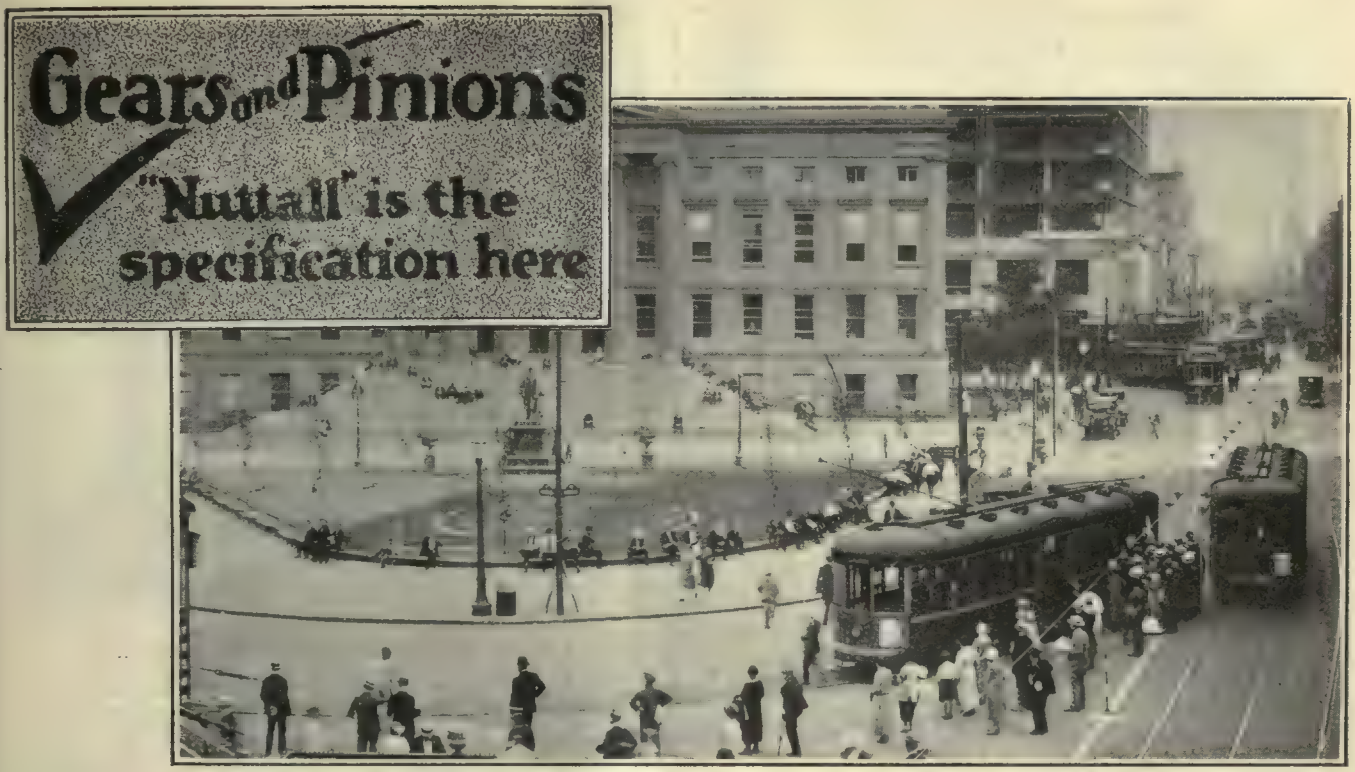
Lift a load
off the fare box

Large railroads and public utilities do not purchase Tribloc Chain Hoists merely because they have a "well-groomed" appearance—it is their performance under the shocks and strains of shop work that has won the recognition of these buyers.

You, too, can know the benefits of using the right size and type of Ford Chain Hoist. All we ask is a brief description of the job—we shall be glad to tell you why and how some type of Ford Hoist can pay its way in your shop and "lift a load off the fare box." Send for Catalog 7-B.

FORD CHAIN BLOCK COMPANY
2nd and Diamond Sts., Philadelphia, Penna.

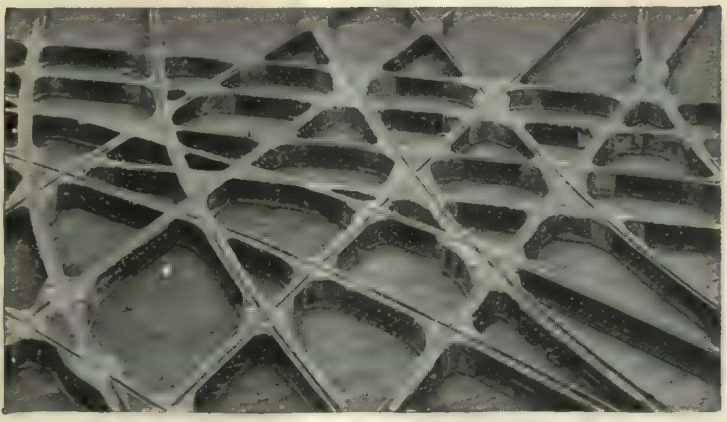
We also manufacture "THE MOTORBLOC"
an electrically driven chain hoist.



R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1926

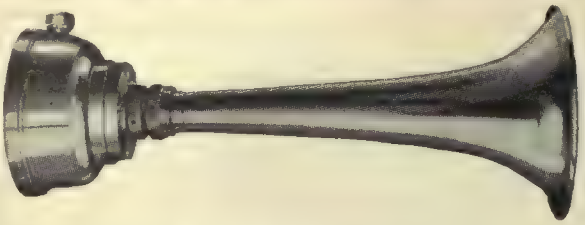


Forty-Five Years' Experience and the best of modern facilities are responsible for the excellence of Buda Trackwork

THE BUDA COMPANY HARVEY, ILL

BUDA
ESTABLISHED
1881

Send us your inquiries



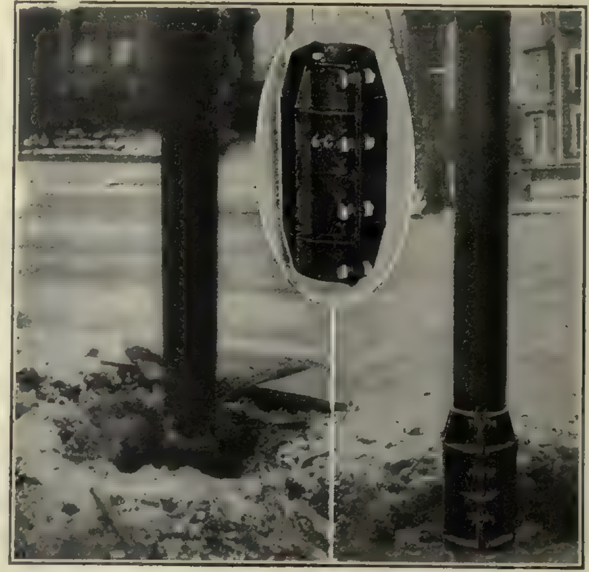
Strombos Signals for Railway Service

A pleasing sound of tremendous volume is emitted from the powerful Strombos Signal which is admirably suited for railway service. Day in, day out, it broadcasts a warning of approaching danger and promotes safe and efficient railway operation.

The Strombos Signal operates on an air pressure of 10 lbs. and over and is controlled by a lever valve and cord. It uses only 1/10 the volume of air required by a whistle. It has no moving parts which might fail in the emergency.

Write us for more complete data.

AMERICAN STROMBOS CO.
INCORPORATED
18th & Market Sts., Philadelphia, Pa.



Clark-Williams Tubular Iron Pole Reinforcing and Extension Clamps

Years can be added to the life of any iron pole which has become corroded at the ground level with our REINFORCING CLAMPS, or added height may be obtained by using the EXTENSION CLAMPS.

ALSO MOUNTS FOR WOOD POLES.

Ask for quotations on your requirements.

The Clark-Williams Engr. Co.
886 Main St., Bridgeport, Conn.
Represented in Canada by the Canadian Line Materials, Ltd., Toronto, Ont.

Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000 Wet 31,400, Line 10,000.

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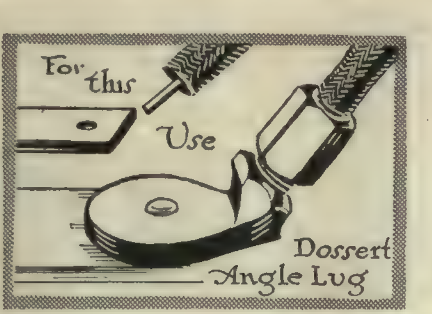

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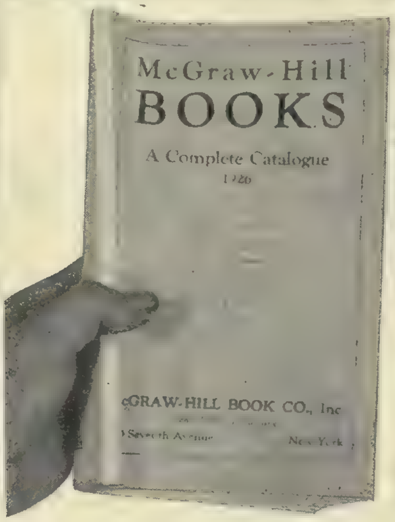

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Another full page ad will appear November 6
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For Locomotives, Passenger, Freight and Electric Cars
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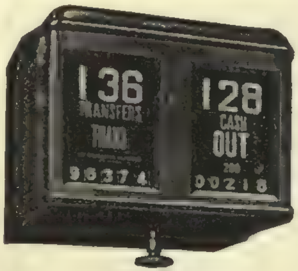

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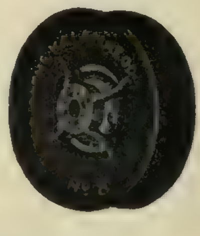

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Are designed to endure and give astounding service under the hardest conditions. Coal mines probably furnish the most severe tests for this type of material and there THORNTON wheels are proving themselves. One operator writes—*"Their life is many times that of the ordinary wheel under heavy current demands."*

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Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Conduits, Underground
Standard Underground Cable Co.

Connectors, Solderless
Dossert & Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Wks.
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

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American Bridge Co.

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American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.
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Copper Wire Instruments Measuring Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

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American Steel & Wire Co.
Brill Co., The J. G.
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International Register Co.
Roebling's Sons Co., J. A.
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Samson Cordage Works
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Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoist & Lift
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
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Wm. Wharton Jr. & Co., Inc.

Crossing, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Crossing Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantasote Co., Inc.

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Elec. Equipment Co.
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Irving S. Van Loan Corp.

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Derailing Switches
Ramapo Ajax Corp.

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Electric Service Supplies Co.

Detective Service
Wish-Service, P. Edward

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Consolidated Car Heating Co.
National Pneumatic Co., Inc.

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Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

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Elec. Service Sup. Co.
Ohio Brass Co.

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Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Railway Trackwork Co.

Electric Transmission Towers
American Bridge Co.

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American Steel & Wire Co.
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Railway Trackwork Co.
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Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

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Brennan, F. J.
Buchanan & Layng Corp.
Byllesby & Co., H. M.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.

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Westinghouse E. & M. Co.

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Perey Mfg. Co., Inc.

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Electric Service Sup. Co.

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Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
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Nat'l Ry. Appliance Co.

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Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

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Carnegie Steel Co.
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Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Frogs, Track (See Track Work)

Frogs, Trolley
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American Bridge Co.

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Westinghouse E. & M. Co.

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General Electric Co.

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Westinghouse Tr. Br. Co.

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Brill Co., The J. G.
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Electric Service Supplies Co.
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(Continued on page 38)

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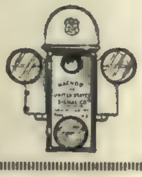

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Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

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Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

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(Continued on page 40)

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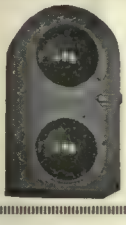

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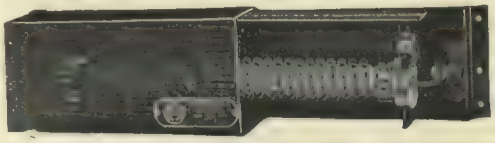

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is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.
Cameron Electrical Mfg. Co., Ansonia, Connecticut

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Seating capacity of Asheville's safety cars increased to 40 with Brill "Admor" Seats

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Increase Seating Capacity

More Seated Passengers
More Satisfied Riders
More Revenue Passengers

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When not in service the Brill "Admor" Seat functions as a substantial barrier, dividing the door openings between in and out-going passengers when, under one-man operation, both classes of passengers use the same platform. It also serves as a "grab" for these passengers.

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PHILADELPHIA, PA.
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What large-scale modernization has done in Providence

Since 1921 the United Electric Railways Company, Providence, R. I., has placed in operation 175 modern cars—79% of its cars in basic service. These had made about 13,800,000 car-miles prior to Jan. 1, 1926.

In 1925 operating costs were 36.77 cents per car-mile, compared with 39.91 in 1921, and this even though a complete overhauling of cars has been in progress for 1½ years.

Maintenance costs per car-mile for Account No. 30 (passenger and combination cars) and for Account No. 33 (electrical equipment) were reduced respectively 10% and 20% for 1925 as compared with 1921.

Pull-ins per 1,000 miles were reduced to 0.292 in 1925, as compared with 0.67 for 1921, a reduction of more than 50%.

The greatest saving has been the reduction of nearly 20% in platform expense, although two-man car operators now receive 9% higher and one-man car operators nearly 20% higher wages.

The Providence management found that modern one-man, two-man cars transport passengers more safely and more economically; that they are superior to its converted one-man cars because they accelerate faster, consume less power, and reduce track wear; that they reflect favorably on the company and on the community.

330-28

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

MAINTENANCE AND CONSTRUCTION ISSUE

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ELECTRIC RAILWAY JOURNAL

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WHITE SIX BUS

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Putting Articles to Work

ARTICLES in ELECTRIC RAILWAY JOURNAL, while avoiding unnecessary and tiring detail, are nevertheless prepared so as to give the important facts needed by the busy executive or engineer.

Recently a prominent railway executive conducted a JOURNAL editor through a new bus garage erected by his company. The editor was struck by the excellence of the design and the care with which many important details of arrangement, construction and equipment had been worked out. He was frank in commenting on this impression.

"You may be interested to know," replied his host, "that this garage is a composite of four or five designs which we selected from those published in ELECTRIC RAILWAY JOURNAL during the past few years. The data from these several designs were carefully compiled. The general arrangements were studied, the equipment listed and the manufacturers of specialties and building contractors noted. Consequently we were able to hold cost to a minimum while at the same time being guided by the best thought and practice from other properties."

This railway knows how to put articles from the JOURNAL to work.

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Variable Load Brakes for Canada!

gives
Uniform Braking
with
Varying Load

One of Canada's progressive traction properties, the Montreal Tramways Company, is now putting into service fifty new city cars that are equipped with modern devices, assuring the fullest measure of operating safety and efficiency.

The Westinghouse Variable Load Brake is among these important devices.

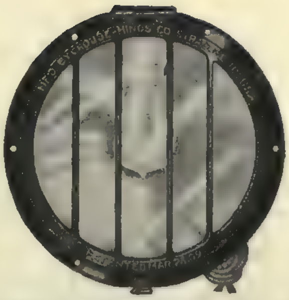
This equipment eliminates the difference in retarding effect on empty and loaded cars—by an automatic adjustment of brake cylinder pressure with the changing load—and assures that stops will be as short under all conditions as would normally be possible only on an empty car. The uniformly short stops are translated into the important advantages of greater safety and speedier schedules.

The Variable Load Brake will therefore share in safeguarding and expediting the movement of traffic over this important transportation system.

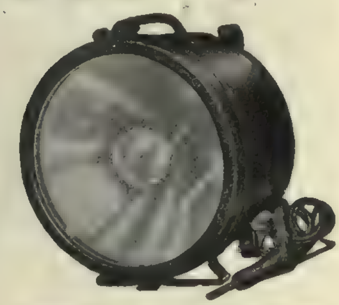
Confer with our representative regarding the desirability of Westinghouse Variable Load Brakes for *your* new cars.

Westinghouse Traction Brake Company
General Office and Works: Wilmerding, Pa.

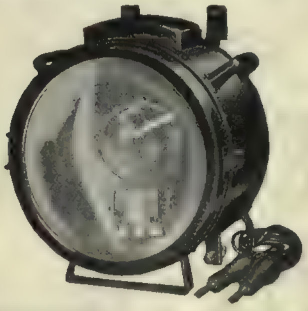
WESTINGHOUSE TRACTION BRAKES



Type Z, for ordinary city service. Furnished with plain or grid door. Casing and door are cast iron.



Type WDP is a portable headlight for city and suburban service. Door plain or grid. Casing is sheet steel.



Type DCP, for interurban service, is the most powerful incandescent headlight made. Casing and door are sheet steel.

O-B Imperials Fit Every Service

NO other line of headlights gives the Master Mechanic as great a variety from which to choose—is as complete in every sense—as the O-B Imperial line. O-B Imperials fit every possible operating condition, are suitable for every type of car.

Back of each headlight is a record of service demonstrating the ability to give efficient, low cost illumination over unusually long periods.

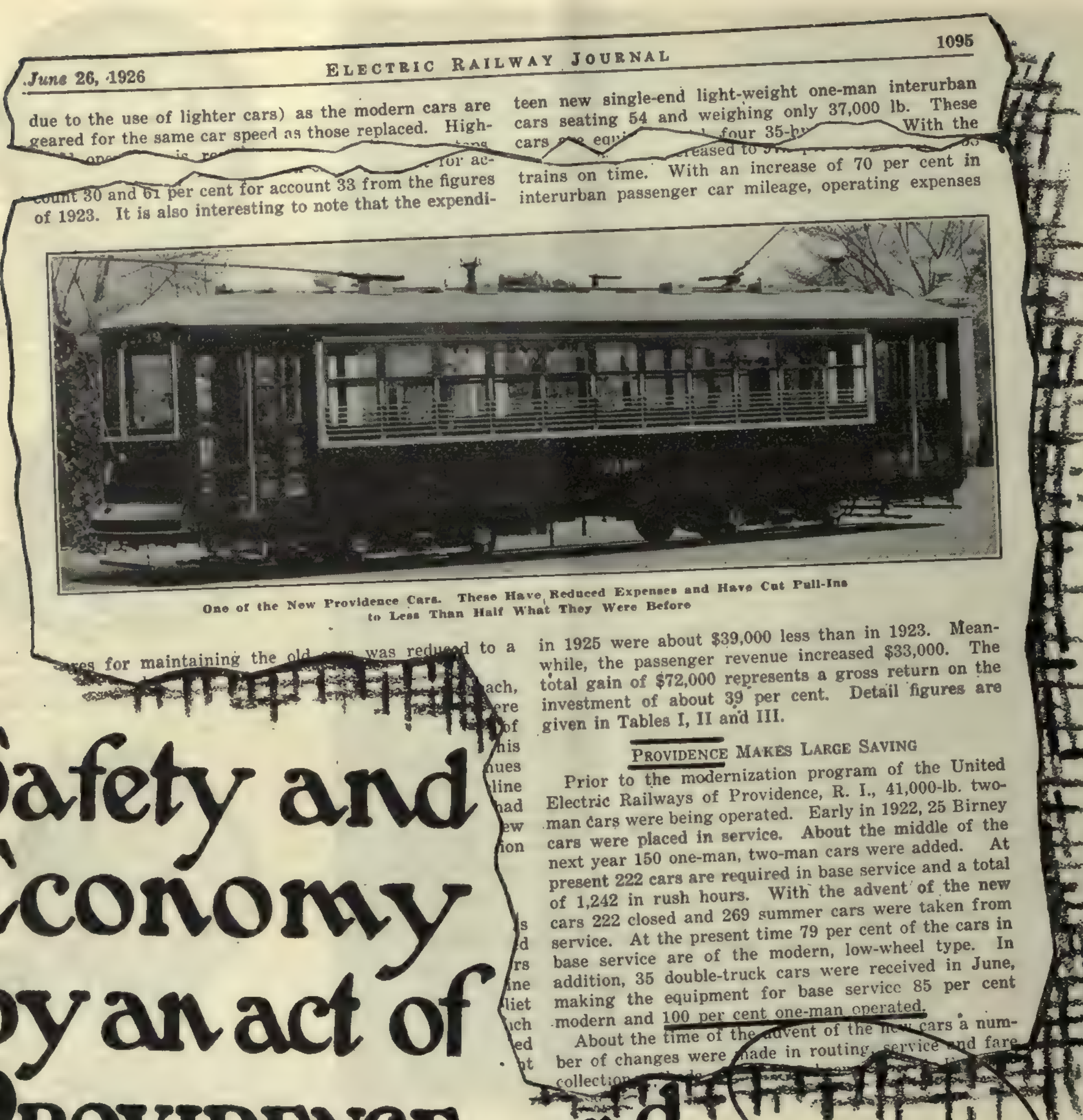
You will assure yourself of all the advantages that only years of specialization in making headlights give, by specifying O-B Imperials on your next headlight order.

Complete particulars concerning design, materials, and applications are given in Catalog No. 210. May we send you a copy?

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
225C

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES



June 26, 1926 ELECTRIC RAILWAY JOURNAL 1095

due to the use of lighter cars) as the modern cars are geared for the same car speed as those replaced. High-

for ac-count 30 and 61 per cent for account 33 from the figures of 1923. It is also interesting to note that the expendi-

teen new single-end light-weight one-man interurban cars seating 54 and weighing only 37,000 lb. These cars are equi four 35-h With the

creased to

trains on time. With an increase of 70 per cent in interurban passenger car mileage, operating expenses

One of the New Providence Cars. These Have Reduced Expenses and Have Cut Pull-Ins to Less Than Half What They Were Before

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in 1925 were about $39,000 less than in 1923. Meanwhile, the passenger revenue increased $33,000. The total gain of $72,000 represents a gross return on the investment of about 39 per cent. Detail figures are given in Tables I, II and III.

PROVIDENCE MAKES LARGE SAVING

Prior to the modernization program of the United Electric Railways of Providence, R. I., 41,000-lb. two-man cars were being operated. Early in 1922, 25 Birney cars were placed in service. About the middle of the next year 150 one-man, two-man cars were added. At present 222 cars are required in base service and a total of 1,242 in rush hours. With the advent of the new cars 222 closed and 269 summer cars were taken from service. At the present time 79 per cent of the cars in base service are of the modern, low-wheel type. In addition, 35 double-truck cars were received in June, making the equipment for base service 85 per cent modern and 100 per cent one-man operated.

About the time of the advent of the new cars a number of changes were made in routing, service and fare collection

Safety and Economy by an act of PROVIDENCE and Safety Car Control Equipment

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:

WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

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It is a safety car if equipped with our standard Safety Car Control Devices

Modernizing Your System!

Start with better Track by using

STEEL TWIN TIES

In concrete they cost no more than other track designs and will outlast the rail. Steel Twin Tie Track requires a minimum of maintenance during the life of the rail.

Construction and cost data and information or quotations on your requirements will be gladly furnished.

The International Steel Tie Co.
Cleveland, Ohio

Steel Twin Tie Track

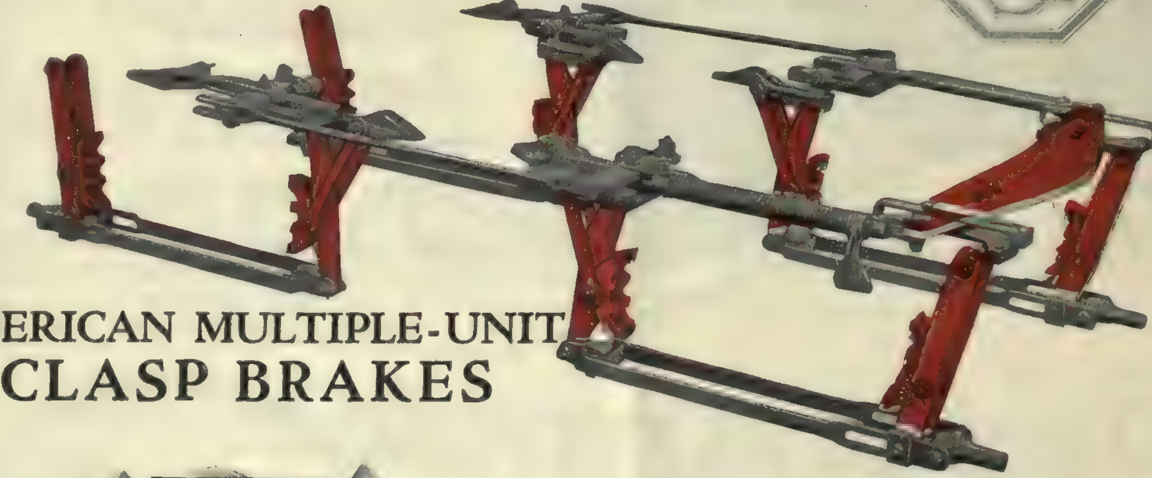
Renewable Track—Permanent Foundation

Would you try to row a boat with one oar?

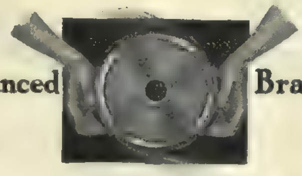
It can be done, but the inefficiency of steering against the turning effect of the one-sided force is obvious.

Similarly, balanced braking (the double shoe clasp type) is vastly superior to the single brake shoe rigging. The heavy braking load is equally balanced on opposite sides of the wheel. There is no shifting of the journal box bearing; no unbalanced load on truck frames and truck springs; less brake shoe wear; less journal box wear; fewer hot boxes; fewer slid-flat wheels; smoother and shorter stops; less train resistance in starting.

In other words, dozens of advantages—all making for economy and better transportation service.



AMERICAN MULTIPLE-UNIT
CLASP BRAKES



Balanced Braking

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

Added attractiveness obtained with de luxe type lighting fixtures

In days gone by an electric railway car was merely a car—a conveyance in which people rode because there was no alternative.

Nowadays, competition has educated people to select a conveyance that not only gets them somewhere but is also attractive.

To help improve the appearance of electric railway cars the newly designed *Dome Type* Safety Car Lighting Fixtures give a luxurious Pullman effect.

These fixtures have beautiful Druid glass bowls which produce a soft, pleasing well diffused light. Substantially made to withstand extreme vibration, these fixtures use 94 watt lamps and compensated circuit.

Full particulars gladly sent on request

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Bldg.

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

And now on fifty more new P.R.T. Cars

THE fifty new cars recently received by the Philadelphia Rapid Transit Company, to augment their service for the Sesqui-Centennial Exposition, are equipped with "STANDARD" Rolled Steel Wheels.

Rolled Steel Wheels

Quenched and Tempered Carbon Steel Axles

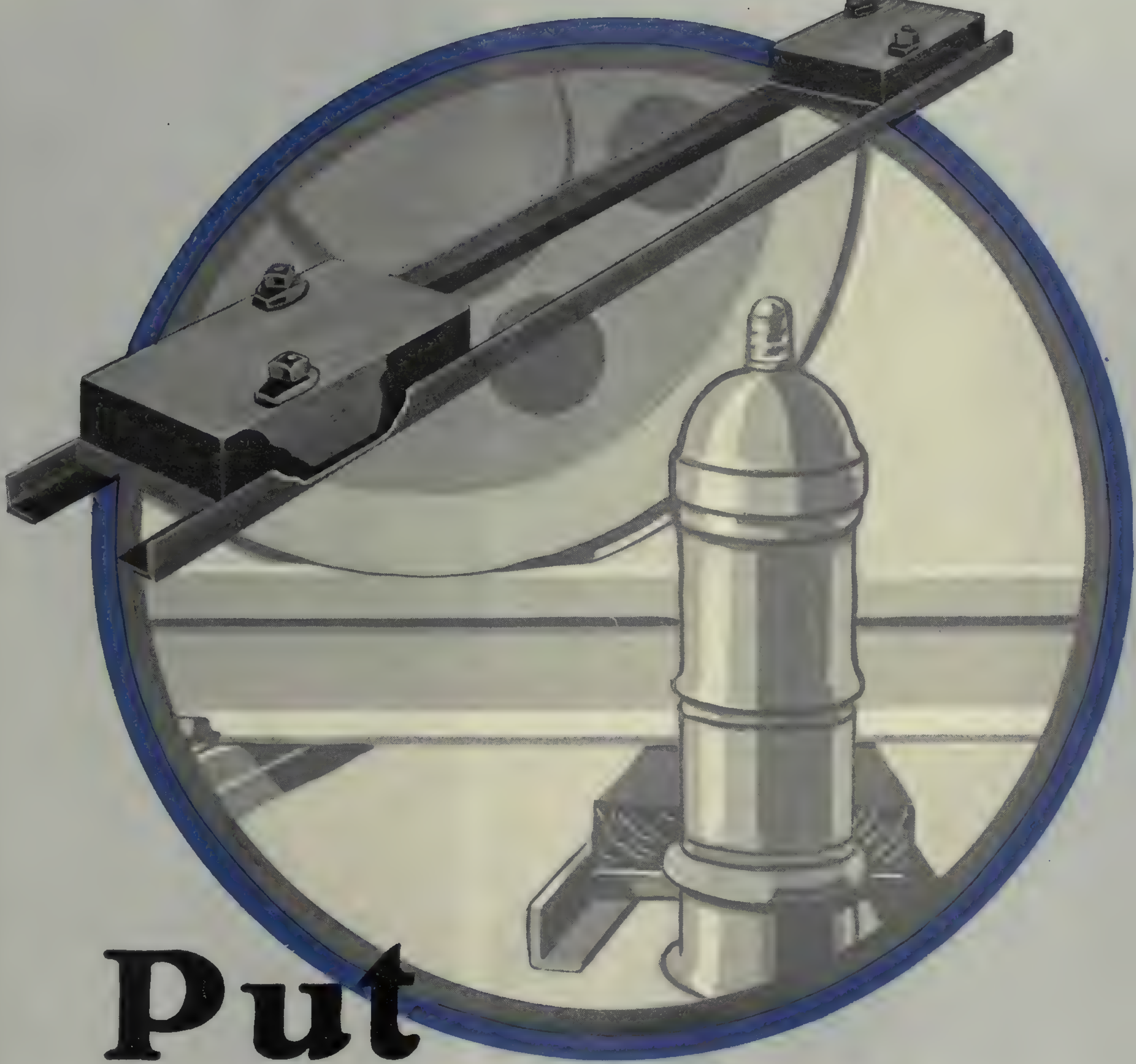
Coil and Elliptic Springs

STANDARD STEEL
WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES:
Chicago
St. Louis
New York
Portland, Ore.
Richmond, Va.
San Francisco
St. Paul, Minn.
Pittsburgh, Pa.
Houston, Texas

WORKS: BURNHAM, PA.

Dayton Ties



Put Shock Absorbers Under Your Tracks

Dayton Shock Absorber Tracks

Reduce Expense
Increase Revenue

Fifteen years of service under heavy traffic—Not a penny of maintenance—Tracks perfectly smooth today—

These are the records which have made Dayton Mechanical Ties standard in over one hundred cities, not only in this country, but in other countries of the world.

Rolling Stock repairs are kept low by the permanently smooth tracks. Patrons prefer smooth tracks, so Dayton Ties have a definite patronage building value.

Dayton Tie Track is less expensive in first cost—the advantages are obtained at no additional investment.

There are Dayton Tracks near you, write for information, and then talk to the engineer who is using them.

Dayton Mechanical Tie Co.
DAYTON, OHIO

NP

DO YOU TAKE FULL ADVANTAGE OF YOUR MODERN CARS?

In modernizing old equipment or in purchasing new cars, railway operators are striving to attain more speed, higher braking efficiency and faster acceleration. But why gain time in operation only to *lose* time in interchange of passengers? The running speed of modern cars counts for little if offset by slow and inefficient operation of car doors. If your patrons are to derive full benefit from the speed, safety and comfort of modern equipment, car doors should be operated with the modern National Pneumatic Door and Step Controlling Mechanisms.

NATIONAL PNEUMATIC COMPANY
Executive Office, 50 Church Street, New York
General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

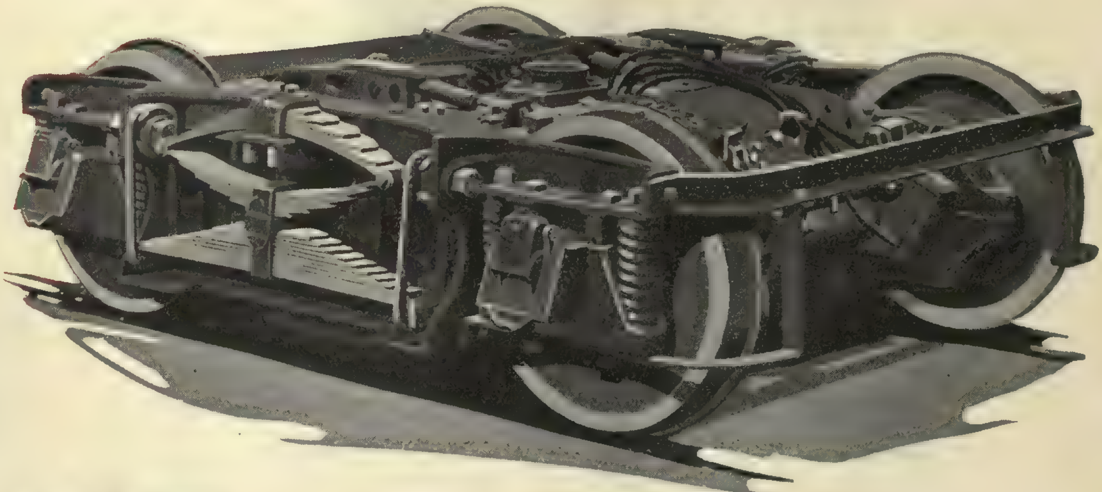
MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

Balanced desig

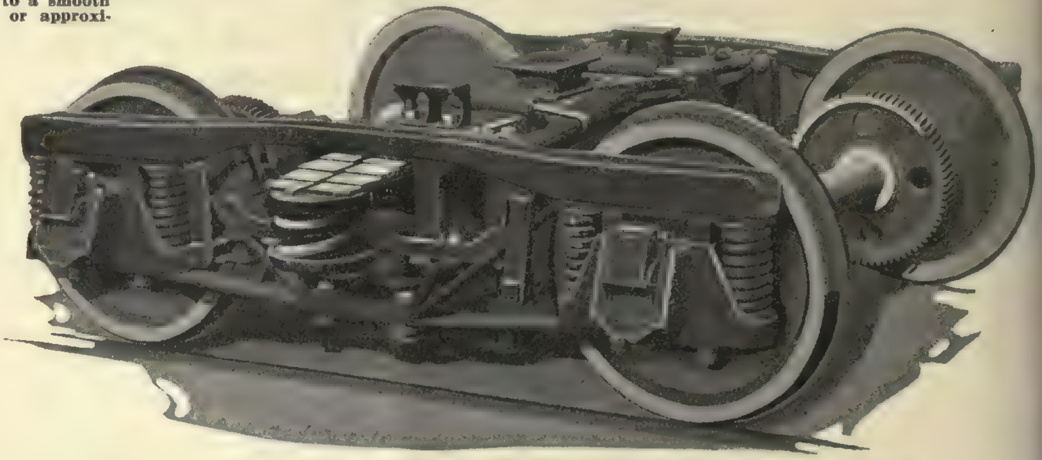
for instance:

You will notice these differences in Cincinnati Trucks



FOR HIGH-SPEED INTERURBAN SERVICE

"Sixty miles an hour with safety." Elimination of "nosing" and "sideway." Duplex Air and Magnetic Brakes which will decelerate a 19-ton car from 60 mph. to a smooth full stop in 800 feet, or approximately 14 seconds.



FOR MODERATE SPEED INTERURBAN OR CITY SERVICE

Top and bottom elliptic bolster springs equipped with series coiled springs to dampen road oscillation, with an additional snubbing device on the bolster transom. Construction marked by a very generous use of high carbon alloy steel. Special type brake shoes and rigging eliminate chatter.

ives you Light Weight

-but with quietness comfort and safety far in advance of conventional practice

Balanced Design, by working toward the perfection of the finished car as a *complete* transportation unit, has faced and overcome many problems coincident to lightweight.

A high speed truck has been developed which eliminates "nosing" and "sidesway," even on light cars traveling at 60 mph. Duplex Air and Magnetic Brakes give the greater stopping power necessary in such operation.

Improved springing in city type trucks has reduced track vibration to a point where it becomes unnoticeable. And drastic insulation not only of truck parts but of body and framework, too, has made silence an outstanding feature rather than a comparative term.

Yet features such as these are but the more obvious differences of car designs in which every part has been so accurately balanced in its relation to the whole, and to modern operating conditions, that the obvious economies of lightweight have been effectively combined with ride merchandising features of proved efficiency.

It is significant that every installation made to date has shown that it pays *and pays well* to modernize with Cincinnati New Lightweight Cars.

Detailed engineering and operating data is immediately available to all interested railway executives.

CINCINNATI CAR COMPANY
CINCINNATI, OHIO

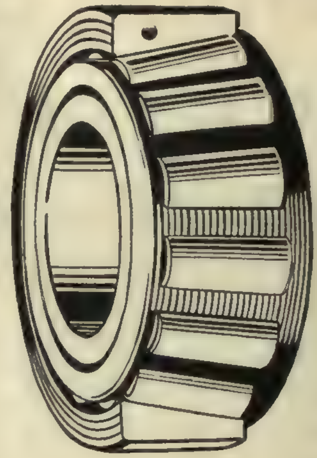
CINCINNATI
New
CARS

A step ahead of the modern trend

In his own interest

one of the most highly-reputed manufacturers of machine tools published the advertisement reproduced below. His statements are typical of the best thought today, among makers and users of Timken-equipped machinery of every type, for every purpose.

THE TIMKEN ROLLER
BEARING CO., CANTON, OHIO



Why we adopted Timkens

KEARNEY & TRECKER'S latest and largest milling machine — the New No. 4 — is equipped with Timken Roller Bearings.

This is not in answer to a popular appeal, nor to add another "talking point". Kearney & Trecker milling machines are not designed that way. Every improvement or new feature must stand the test of rigid experiment, otherwise it is never adopted.

In October 1921 we first put Timken Roller bearings into a milling machine. That pioneer machine has been running day in and day out in our own shop ever since. For five years it has been submitted to all manner of service far more severe than would ever be encountered in normal operation.

Exhaustive experiments have borne out the fact that anti-friction bearings provide (1) Greater load carrying capacity (2) Increased mechanical efficiency and (3) Longer life. Not only that, the reduction in overhanging loads and clearances required, all make for greater rigidity of drive.

Anti-friction bearings have earned their way into Kearney & Trecker milling machines by sheer merit. In our judgment, they accomplish the greatest usefulness in the bigger sizes of machines where it is necessary to transmit a large amount of power.

That is "why we adopted Timkens" in our new No. 4.

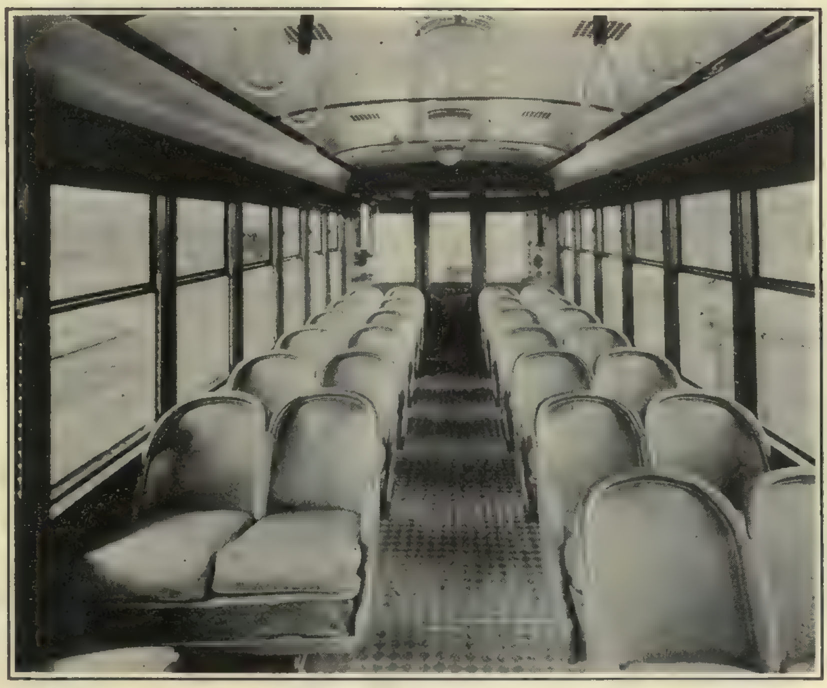
MILWAUKEE MILLING MACHINES

KEARNEY & TRECKER

MAIN OFFICE AND WORKS: MILWAUKEE, WISCONSIN

Comfortable Cars for Contented Passengers!

EQUIP your lines with St. Louis-built "Quality Cars"—a real reason for the public to leave its automobiles at home and ride the rails in safety and comfort.



Single End Double Truck City Cars with Smoking Compartment in Rear

New and Better Designed Cars to meet the demands of a Discriminating Public

for further particulars, write

St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car"

American BROWN BOVER

5. Negligibl

The rectifier proper, and its few pieces of auxiliary apparatus, are so simple and so rugged, that there is little or nothing to wear out, or require attention. The arc itself operates in a vacuum, so there is no deterioration of the anode or of the mercury. Anodes examined after years of operation show same micrometer measurements as when installed. Absence of moving parts obviates frictional wear and tear. There is no vibration in operation.

steel enclosed—
no glass parts

ABB

Principal Products

Mercury-Arc Power Rectifiers (steel enclosed)
Electric Locomotives—for any system of current, high or low tensions
Complete equipment for railway electrification
Rotary Convertors
Motor Generators
Diesel-Electric Locomotives
Mining Locomotives
Switches, Controllers and all Auxiliary Equipment
Steam Turbo Generators for normal or high pressures and superheats
Automatic Regulators
Oil Switches
Condensers and Auxiliaries
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators
Ships
  Diesel Driven
  Turbine Driven
  Electrical Driven
Structural Steel Fabrication

Mercury-Arc Power Rectifiers

naintenance

Chief Advantages

(1) Efficiency high over the whole working range.

(2) Simple operation and minimum attention.

(3) No synchronizing.

(4) Very high momentary overload capacity and insensibility to short circuits.

(5) Negligible maintenance.

(6) Low weight. No special foundations.

(7) Noiseless and vibrationless operation, consequently rectifier substations can be erected in densely populated localities.

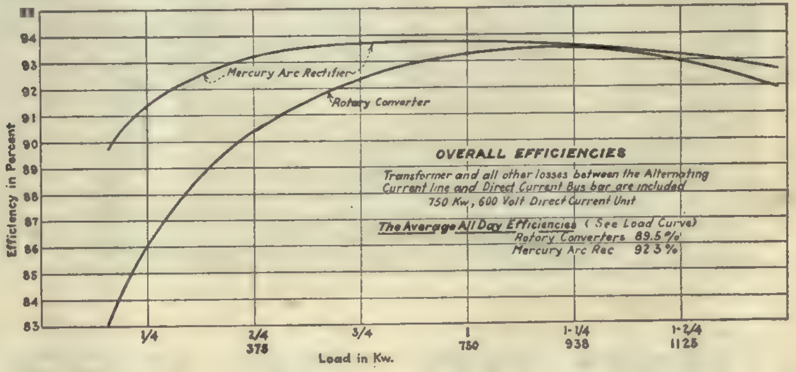
(8) New sub-stations need only be of light construction. In many cases old houses can be converted, while the plant can often be erected in places that could not be considered for rotating machinery.

With a BROWN BOVERI MERCURY ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, *cut down tremendously,* even at Rail Voltages as low as 600 V.

Below is shown what can be done in an Actual Case by the use of Mercury Arc Rectifiers. The reference is to an Interurban Railroad in one of the Eastern States. The substation rating is 750 Kw.-H., 600 V. The part of a record roll reproduced on this page shows the usual output over a period of six hours.

The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

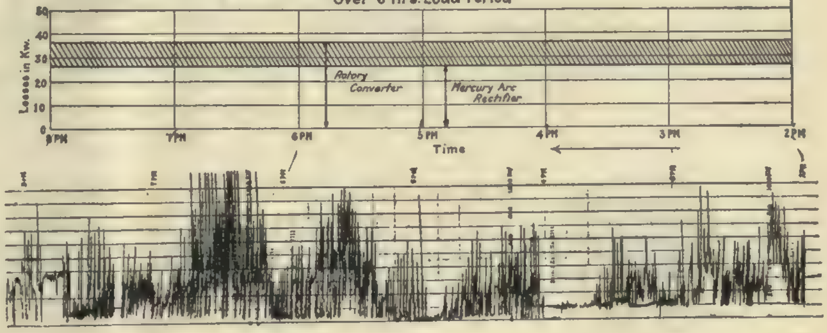
for Rotary Converters.............. 89.5%
for Mercury Arc Rectifiers.......... 92.3%



The saving obtained in six hours (represented by the shaded area) when extended over a 20-hr. day, amounts to MORE THAN 200 KW.-H., or, at 1c. per Kw.-H., THE ANNUAL SAVING effected is $730.00, which is the INTEREST on MORE THAN $10,000.00.

In addition to the power saving, the maintenance cost will be less than half as much as with rotary converters.

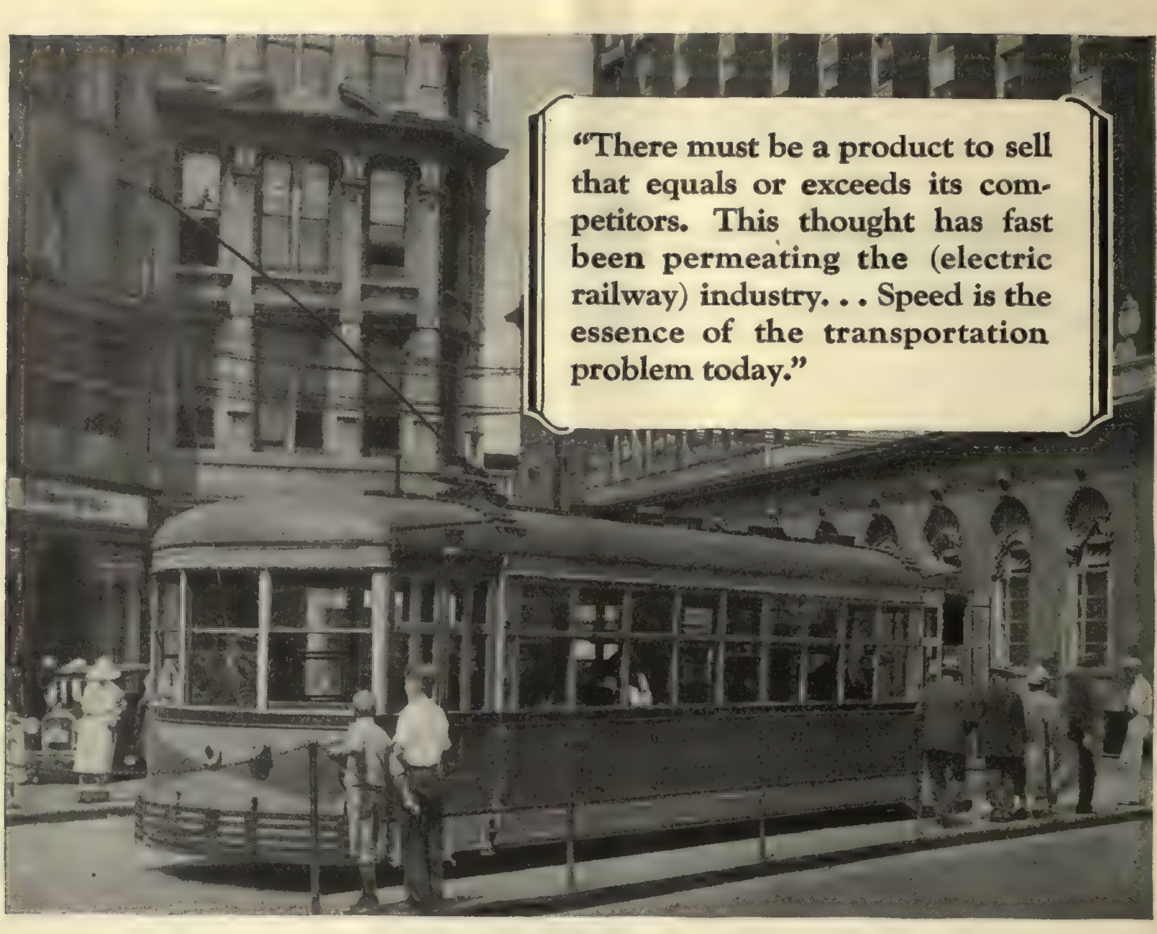
Comparative Average Converting Losses in Kw.
Over 6 Hrs. Load Period



American Brown Boveri Electric Corporation
165 Broadway, New York, N. Y. Camden, New Jersey
922 Witherspoon Bldg., Philadelphia 842 Summer Street, Boston 230 South Clark Street, Chicago

MEMBER AERA 1926

AMERICAN BROWN BOVERI



"There must be a product to sell that equals or exceeds its competitors. This thought has fast been permeating the (electric railway) industry. . . Speed is the essence of the transportation problem today."

Step up the speed–
step down the costs

Here you have in a few words the policy of the Grand Rapids Railway—an objective of every electric railway that aims to be progressive.

This company felt that the time had come for an entirely new street car, designed to serve and satisfy the riding public, and to have a better *net*-earning power. It has put in operation 27 new light-weight cars which embody the latest results of practical experience in the equipment of electric rail coaches, and which have

—developed schedule speeds of 9.5 miles per hr.
—decreased energy consumption over 40%
—increased passengers per car-mile over 60%

This is one of many instances in which G-E Equipment has had a part in demonstrating the earning possibilities of modern cars. Your G-E railway representative can give you maintenance figures for similar G-E Equipment covering a period of years.

The cooperation of General Electric is offered for the development of any improvement or the production of any electrical equipment necessary to a program of car modernization. Many instances can be cited in which modern G-E equipped cars have achieved notable savings or developed new sources of revenue.

330-27

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 68 New York, Saturday, October 23, 1926 *Number* 17

Changes from Conventional Truck Design Are Attracting Increased Attention

DURING recent years many radical experiments in truck developments have taken place in Europe. Both in Germany and France marked changes from conventional practice have been incorporated in new equipment that has gone into service. Articles covering some of these designs have appeared in recent issues of this paper.

There is a growing feeling among equipment engineers in this country that further substantial improvement in car performance cannot be made without undertaking distinctly radical changes in truck and motor suspension design. The conviction is growing that the elimination of noise, improvement of riding qualities and reduction of wear on expensive track and special work are dependent on reducing the excessive unsprung weight in conventional design.

Removal of the motor from its present position on the car axle is a step in this direction. Application of this idea in Europe has been limited largely to single-truck cars. On double-truck equipment this construction offers additional problems, but these seem far from impossible of solution. At the present time there are under consideration in this country several experimental designs of this character. In most cases these go considerably further toward the adoption of automotive type spring suspensions and driving arrangement than do the foreign designs.

Various advantages seem to accrue from this general form of truck arrangement. In addition to the reduction of unsprung weight, which eliminates much pounding on track and special work, there is to be expected a marked reduction in gear noises through the provision of oil-tight housings in which the gears can be maintained in accurate alignment and kept immersed in an oil bath. Reduction of the mechanical strain on motor frames and of vibration, wear, tear and shock, resulting from the removal of the motor from the car axle, permits the use of increased armature speeds and reduced motor weight.

There are, of course, many problems of design to be worked out. Some of these will require heavy expense and considerable time for final solution. It is also probable that any such general change in construction will make running parts less accessible for maintenance, will require a more skillful class of maintenance workmanship and may prove more costly to repair in the event of mechanical failure. On the whole, however, the advantages which seem to be offered appear to outweigh the possible disadvantages.

Simplicity and ease of accessibility have been the principal advantages attaching to the present conventional form of truck construction and motor suspension. But on some properties where track is rigid and service severe, serious difficulties from broken armature shafts and open armature leads have never been successfully overcome. When the present form of single reduction gearing was adopted as the most reliable and simple construction for car propulsion, the general art of gear and bearing design was in a very rudimentary stage. The automobile has brought about a most remarkable development in gearing and anti-friction bearings. These now make possible changes in conventional car practice which would have been inconceivable in the days when the present form of construction was adopted.

Europe is apparently achieving a considerable measure of success with radical changes in truck construction. Some of the experiments in this direction have been in progress for a length of time to warrant more than passing attention on the part of every one in this country who is interested in car improvement. Now that the entire industry has become keenly alive to the advantage of both improved appearance and performance of its cars, it is to be hoped that some of the designs which have been contemplated for some time may soon be constructed and put into service.

Operating Men Have an Important Part in Stimulating Development

IN THIS era when high-class electric railway service is foremost in the thoughts of railway operating officials, it is quite natural and essential that many new developments should be proposed. Manufacturers who originate the improved equipment, of course, are anxious to have it tried so that any weaknesses which may develop can be corrected and so that general sale can be undertaken. The electric railways can help materially by trying out and testing new ideas.

The average electric railway man hesitates to put into service any new device which does not have the stamp of extended operating success. Installation of experimental apparatus often results in annoyance and considerable expense. If real results are to be obtained the trial must be watched carefully. Frequent inspections and adjustments may keep a car from service when it is needed urgently. Failure may also result in damage to another piece of equipment. These, however, are the contributions which electric railways must make to the industry in order to promote active development of many much-needed devices.

The duties of electric railway men should not end with a trial of a device which may result in failure. Further improvements should be suggested by the operators. Sometimes a failure is the only means of showing where weaknesses lie and what changes should be made. Some of our most useful pieces of equipment were only moderately successful at the start. Severe service was required to disclose weaknesses and the

This is the issue in October that is devoted essentially to maintenance and construction subjects

application of many minds was needed to produce necessary improvements.

Electric railway officials and manufacturers must co-operate to bring about the advances in equipment which are so urgently needed. Imagination is essential. Intelligent merchandising effort demands close study of the desires and preferences of the customer. Railway mechanical men must acquire this modern viewpoint regarding their work. We are living in an age of prosperity and all classes demand luxury. Car riders do not know that special spring combinations are needed to produce easy riding trucks or that certain features of track construction influence the amount of noise produced. When these improvements are effected, however, they must be of a nature to make the passengers sense the increased comfort that comes in their ride. Some suggested improvements may be visionary, but it is important that the railway man do his part in co-operating with the manufacturer by entering into the spirit of experimentation with a full realization that very often progress is made only after many preliminary and costly failures.

Good Will Thrives on Straightforward Human Relationships

TEAMWORK is an attribute which has never proved more valuable nor more practicable than at the present time. Between individuals it is useful. Between companies it is essential. Between railways and the communities which they serve it is utterly indispensable. In the whole field of track and paving work the possibilities of profitable co-operation between city engineering departments and the railways are limitless. Nor are the advantages all on one side, for the city may profit equally with the railway in laying out paving and track-replacement programs so as to avoid duplication of work. Strangely enough, when real co-operation exists between city officials and the transportation company, little is heard about the matter. Let a city and its transportation agencies work together on a smooth basis of mutual accord and few laymen are the wiser, save for a vague feeling that things seem to get along pretty well in their community. But let the municipal authorities, either through indifference or with seeming deliberateness, give no heed to the financial resources or physical abilities of the railway, or let the railway executives fail to lay their cards on the table and play fair with the city, then immediately there is a tumult and uproar in the community, which, sadly enough, usually seems to center over the heads of the electric railway men, regardless of their degree of innocence or of their culpability in the matter.

In communities where thinking along these lines is sound, arrangements have been made to confer on programs for track and paving work some time in advance of the date when operations are actually to be started, so that the two elements may be fitted together as effectively as possible. Under these conditions municipal authorities have shown a readiness to lend an attentive ear to expositions of the railway viewpoint, while the managers of the property have, for their part, overlooked no opportunity to accede to aldermanic requests whenever possible to do so. That the latter course is profitable is evidenced by the fact that municipalities have in several instances volunteered to stand the expense of paving the track strip in return for an evident desire by the railway to plan its track construction so as to tie in with the paving program of the municipality's street department.

Of course, co-operation in any form is largely a matter of human relationships, and it is well worth the effort on the part of railway men to make a careful study of the individuals with whom they must deal. Few men are so immersed in their own ego that they cannot be reached and influenced by a straightforward presentation of facts and a friendly and cordial attitude which does not savor of pandering.

It's Not the First Cost but the Upkeep that Determines

MAINTENANCE of electric locomotives may prove to be a determining factor in the selection of systems. From time to time the industry is apprised of new units of electrified railroads that have been put into operation, but the operating statistics are not so frequently made a matter of public analysis. In this issue, Dr. Neithammer tells of a 284-mile section between Stockholm and Göteborg, Sweden, recently electrified. He submits the statement that the single-phase system does not appear to be materially inferior to the direct current system of electrification.

What the industry needs are facts to determine whether one system or one type of locomotive has points of superiority over others. Unquestionably, the first cost is an important element, but the factor that will gain in weight as time goes on is the cost of maintenance. A study of the maintenance costs per locomotive-mile or per ton-mile for the electrifications in this country varies through astonishing ranges.

The difference in fixed charges between any of the major systems of electrification when reduced to cents per locomotive-mile would be small in comparison to the variation in maintenance costs that can be found between any of the major systems. In short, it is not the first cost but the upkeep that counts, and the sooner such maintenance cost differences are determined and capitalized the sooner opinions will give way to facts.

Kansas City Reorganization Gives a Fresh Start

RESTORATION of the property of the Kansas City Railways to its owners has been made and the receivership has been ended. The successor company is the Kansas City Public Service Company. It starts out under circumstances that seem to be propitious. To some the plan of reorganization appeared to be too drastic in that it wiped out equities which they felt were entitled to more consideration than they received. The scaling down of securities was drastic, but it has had the sanction of the courts.

In handling the property the receivers did well, as did also the operating organization which functioned subject to their direction. During the years of the receivership—and for one reason or another the receivership was a long one, but one not unduly protracted considering all the problems involved—much was done to restore the road to prestige. Much more remains to be done. The successor organization realizes this, and it has already started on a program of improvements based on a knowledge of the needs of the system and founded on the belief that the city is prepared to co-operate. That the municipality is so disposed is shown by the twelve-year extension of the company's franchise, making the term of that grant 30 years. This is a period none too long. Meanwhile, the advisability of revising the terms of the grant are being considered so as to bring them more nearly in line with modern thought on grants of this kind.

The new company has at its command all the money turned over to it by the receivers, but this sum will be entirely inadequate to meet the costs of the $6,000,000 reconstruction program which is required. Concessions in fare have already been authorized. But the new company is pledged without reservation. It can do only certain things under the grant as at present extended. It cannot, however, do under these terms all the things that are possible under a modern franchise with provisions designed to give flexibility in meeting the exigencies of modern operating conditions. Lifting of the receivership is a highly desirable accomplishment. It marks, however, the beginning of a new period rather than the ending of an old one. And the course which events take in the future is as much in the hands of the city as in those of the management. The obligation is a mutual one.

Service Equipment, Too, Affects the Public's Opinion

KEEPING an eye on the things which appeal to the man in the street subconsciously rather than consciously is not the least important phase of transportation merchandising. For example, there is the matter of keeping the wrecking cars and trucks in first-class physical condition and fully stocked with all necessary tools and equipment. It cannot be gainsaid that this has a distinctly favorable psychological effect on public and employees alike. Likewise is it essential to have the wrecking crew fully organized and drilled with the precision of a fire department so that no time or motion will be lost in getting to the scene of trouble.

When a street car becomes involved in a street accident, for whatever reason, or succumbs to mechanical ailments, there invariably are native wits on the sidewalks to "wise crack" at its expense. As long as it remains thus exposed to public view the car forms a distinctly adverse object lesson for public observance and it therefore behooves the railway to remove it or repair it at the earliest possible moment.

Appearance of service equipment may at first glance seem secondary to the condition of passenger rolling stock. However, a well-painted, fully stocked wrecking car or truck appearing at the scene of an accident or breakdown cannot fail to impress spectators with the progressive, efficient attitude of the railway. Sometimes when a decrepit, unpainted, broken-down appearing service car clatters along the street, people are inclined to speculate as to which is the savior and which the saved.

Dollars and Sense the Measures of Co-operation

FOR every day use a good hypothesis would be one which states that the maximum of co-operation between maintenance and operating departments will bring a maximum return in dollars and sense. The latter is perhaps a poor pun. However, it at least suggests a corollary for the above hypothesis, namely, that the dictates of common sense should preclude any unnecessary abuse of rolling stock and other railway equipment. It is the job of the maintenance forces to keep cars and buses "up to scratch" in so far as physical condition and efficiency are concerned. It is just as much the job of the transportation department to see that this equipment is not subjected to greater punishment than reasonable service conditions require.

As a "horrible example" there is one electric railway property when the transportation men pride themselves on the fact that no allowances are made in the operation of equipment throughout the most adverse water and snow conditions. Regardless of the depth of water over the tracks the operators are permitted to send their cars through at speeds which literally invite electrical trouble. To no avail has the master mechanic torn his hair and presented report after report to show the very real cost of this foolhardy attitude. There have been times when a large proportion of the company's rolling stock has been waiting its turn in the shops, as a result of failure by the operating department to exercise a little judgment on where and how fast cars might be operated during the temporary existence of water obstacles.

Service maintained in the face of adverse weather conditions is, of course, one of the first principles of satisfactory transportation. It is a laudable ambition on the part of the transportation department to defy the elements in keeping its cars moving. But its responsibility goes further than merely running the cars. It is equally important that the greatest possible diligence be exercised in protecting the equipment by limiting speeds at bad spots, cutting off power when running through water and otherwise helping to prevent electrical trouble. To do otherwise is flirting with inevitable disaster and is not in keeping with the modern spirit of team work between departments. A little headwork at the proper time will save a lot of back work later, and, incidentally, many dollars.

Greater Interest Can Be Enlisted in Engineering Association Work

A GOOD start was made during the past year to bring about greater co-operation between the American Electric Railway Association and the various state and sectional associations throughout the country. This is undoubtedly a step in the right direction, which will tend to knit the industry closer together and to bring about greater co-ordination of effort in handling common problems.

Contact between the engineering association and the equipment, track and electrical men in sectional associations would likewise bring better understanding of common problems and greater unity of action. In the case of engineering association work, one of the greatest difficulties has been that of getting adequate representation of the industry on the various committees, and of bringing about general acceptance of recommendations and standards after they have been adopted.

In most sectional association meetings considerable time is devoted to the discussion of construction and maintenance subjects. Here there is an opportunity to discuss topics that are on the program of American Electric Railway Engineering Association committees. Membership on some of the more important engineering association committees might well be selected with a view toward having representation from the various sectional associations. Thus current subjects that are being studied could be taken up at sectional association meetings, and the assistance enlisted of those in charge of maintenance on many properties that are not directly represented on engineering committees.

Important Considerations in Replacing Commutator Bars

Pure Hard-Drawn Copper Best for Commutator Bars and Section Should Be Same as Adjacent One—Each Individual Unit Should Be Placed on a Surface Plate to Determine Its Trueness and Be Straightened if Bent

By Jesse M. Zimmerman
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

Cleaning Bath in Which Individual Copper Bars Are Dipped to Remove All Dirt and Grease

IN THE course of development of commutating machinery, various metals have been tried for commutator bars. These different metals range from silver, pure copper, both hard and soft, through various alloys and brasses, cast copper of various purities, aluminum, wrought iron and even cast iron. Experience has shown that all of them can be used in commutators if one is willing to pay for the high price of maintenance and unsatisfactory operating characteristics plus a higher first cost. The use of any other metal than pure copper or silver will mean a larger commutator. This in turn will mean an increased size of the machine.

Iron bars were at one time used in a commutator for an electric railway motor. The commutator soon developed high mica, and the commutating surface became blackened and blistered. Sparking gradually increased until commutation reached a state where it was impossible to operate the motor. High mica was not caused by the metal wearing faster than the mica. It was caused by the contact surfaces burning away, leaving high mica.

Aluminum was then tried. It worked better than iron, in that burning, blackening and high mica did not appear so quickly. However, like iron, it did not take a polish and soon had a dull appearance, gradually turned black and burned badly. This, no doubt, was due to the high contact resistance of the aluminum oxide which formed on the surface, due to sparking.

Bronze, brass, cast copper and copper alloy were tried for commutator work. While they gave better results than aluminum or iron, the commutator would develop high mica more quickly than ones made of copper hard-drawn from pure ingot metal. This burning action is a function of the contact resistance, current density, non-burning and non-blistering qualities of the metal used in the commutator. Anything which tends to increase the heat-conducting properties of a commutator will tend to decrease the burning action. This has been clearly demonstrated in an elaborate test of carbon brushes on a collector ring, where the question of commutation could not disturb the conclusion. Such tests were made on cast iron, wrought iron, bronze, various alloys, including cast copper alloy, and pure copper. With high current densities, the burning and blistering action appears to depend on the ability of the metal to conduct the heat from the contact surface. The fusion of the metal on good heat-conducting materials will be so small that the polishing action of the brush will keep the surface in a smooth, glossy condition.

The electric conductivities of the metals and their mixtures in alloys bear a fairly close relation to their heat conductivities. Through extensive tests, it has been found that very little impurity in copper will reduce the conductivity to possibly one-third. Most of the alloys of copper have a very low heat conductivity compared with pure copper. Wrought iron or aluminum have a lower heat conductivity than copper alloy. According to this argument, silver should give the best commutation. It does, but is too expensive for this purpose.

Removing the Burrs from Both Sides of the Individual Copper Bars by Grinding

Copper Bars Being Straightened Before Building into an Assembled Set of Commutator Segments

The use of copper alloy, which costs almost as much as hard-drawn copper, does not warrant the increased cost of maintenance and interruption of service. Furthermore, if a motor working at its maximum rating with a commutator made of pure copper has this removed and has substituted a commutator having copper alloy whose conductivity ranges from 50 to 60 per cent, it certainly will be overloaded.

From the foregoing it is evident that bars to be used in renewing a commutator should be of the same material and workmanship as the original copper bars.

The bars should be made from pure hard-drawn copper whose conductivity is not less than 98 per cent, 100 per cent being based on copper having a resistance of 9.59 ohms per mil-foot at 0 deg. C.

The bars should be made of hard-drawn copper having a Brinell hardness number of not less than 75 to 80. They should be able to withstand a fiber strain of 25,000 lb. per square inch in order to overcome the stresses due to centrifugal force and stresses caused by alternate heating and cooling of the commutator while in service.

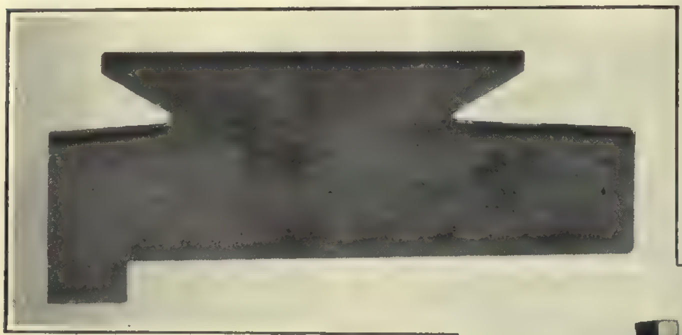
The Brinell hardness number for cast copper bars which are later "drop forged" or "bumped" is from 50 to 55. Soft copper has a Brinell hardness number of 38 to 40. From this it can be seen that the hard-drawing process will produce better commutator copper.

The die through which the copper is drawn is called a section. The opening in the die conforms with the cross-section of the bar, as shown in an illustration. During the drawing process, samples are taken for analysis which include quality, hardness and gaging of the section. Gaging to see that the size of the bar remains uniform is a frequent operation.

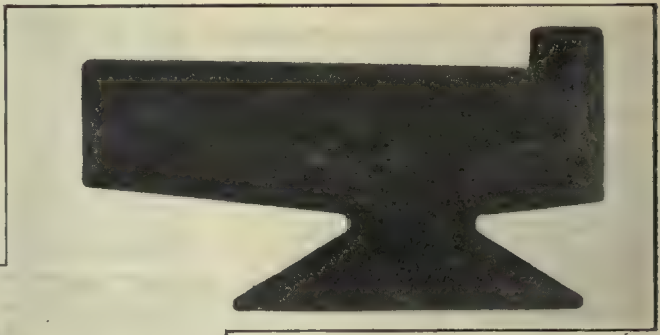
The copper bar must not vary from the specified section to either of the drawn edges by more than plus or minus 0.001 in. The algebraic difference at the two drawn edges must not exceed 1 mil. If this variation is not adhered to the distance from any bar to the corresponding bar under the next pole may vary more than plus or minus $\frac{1}{32}$ in.

The concavity of each surface of a bar must not vary more than 1 mil from the computed thickness, i.e., the gaged thickness at any point must not be more than 0.002 in. less than the computed thickness and the convexity of the surface must not vary more than 0.0005 in.

All bars should have a drawn radius at the bottom chord. When a $\frac{1}{32}$-in. mica extension is allowed in the bore, the combination of the two gives a large creepage between bars. On some motors the space between the bore of the assembled segments and the commutator spider is so small that it is necessary to machine the bore of the assembled segments. In such cases the drawn radius is of no value.



Hard Drawn Copper Bar as It Comes from the Die



Edges and the Sand Holes Remaining
Cast Copper Bar, Showing the Rough

Hard-Drawn Copper Bar After Years of Service

All commutator bars should be chemically cleaned to remove all grease and dirt. They should be free from roughness, cracks and laminations. The surface of each bar should be ground to remove the burrs caused by punching and sawing, as well as all foreign particles adhering to the copper. Each individual commutator bar should be placed on a surface plate and straightened by light hammer blows if bent or untrue.

In the old days some of the motors had the commutator bars punched to size. It was thought the bars could be punched and then assembled. This did not work so well, due to the variation in the copper. If the copper ran heavy, the commutator gage diameter would be too large, causing an arch-bound commutator. Sometimes the gage diameter would be so large that the spider V's should not fit the copper V's at all. If the copper bars were thin, the commutator gage diameter would run small. When the commutator was assembled, open places between the bars could be found. After extensive tests, it was found necessary to machine the V's to an accurate gage diameter after the assembled segments were built up and held together by a clamping ring.

Bars for use in repairing commutators are supplied in two forms. They are, bars punched to an unfinished size and rectangular bars. Where a large number of bars are needed, a punching die is used to punch the bars to an unfinished size; that is, the V's are punched leaving $\frac{1}{16}$ in. for finishing. All repair bars for these commutators are supplied in this manner.

The sale of a great many motors is so small that it is cheaper to machine the V's from the rectangular bars after they are assembled than to make a punching die. These bars are sawed into lengths corresponding to the unfinished over-all dimension. These are called rectangular bars. For repair purposes rectangular bars should have the V's rough-sawed, leaving $\frac{1}{8}$-in. material for finishing.

METHOD RECOMMENDED FOR REPLACING SPARE BARS

After removing the damaged bar, an undamaged adjacent bar can be used for a pattern and a new mica strip can be cut to the same size as the unfinished bar. The mica strip can be fastened to the copper with a thin coat of heavy pure orange shellac. The unfinished bar should then be clamped in a vise with a pattern bar and trimmed to approximately the outline of the pattern. If the V's have been rough-sawed or punched, the amount of filing necessary may be reduced by taking an extra cut with a hack saw. The unfinished bar and the pattern should then be clamped in a vise with a mica strip between them and the V's of the new bar should be filed to the same size as the pattern bar. The radius in the V's can be finished with a small rat-tail file. The bars are then ready to be placed in the commutator.

When reassembling the commutator, all the bars and the V-rings must be in their proper places, with the commutator nut fairly tight. The commutator should be heated to 125 deg. C. in an oven, and while still hot a pressure of from 20 to 30 tons should be applied to the detachable metal V-ring as the commutator nut is turned home.

A good method of testing for loose bars is to tap on the face of the bars at the front and rear. If a bar is loose it will vibrate. Leads should be soldered in the commutator slots, the face of commutator turned and the mica undercut. Tests should then be made for grounds and short circuits.

The value of having all commutator bars made accurately to size cannot be overemphasized. Investigation of causes for commutator troubles has shown many that result particularly from use of mica V-rings which are scant in thickness or oversized. These have been used to compensate for the inequalities of the bars themselves. Many of the loose bar troubles will be overcome if care is used in selecting bars needed for repairs.

Remedying Radio Interference in San Diego

Low Pass Filters Are Being Used by the Railway to Eliminate Noises in Local Receiving Sets Caused by Motor Commutation—Exhaustive Series of Tests Was Conducted to Determine All Causes of the Disturbances

BY G. W. SHAVER
Superintendent of Equipment San Diego Electric Railway

EIGHT months or more ago official complaints were made to the San Diego Electric Railway that it was producing severe radio interference. A committee composed of representatives of the Department of Commerce, the U. S. Navy Department, the Chamber of Commerce, the power company, the telephone company, the radio club and the railway made an investigation with portable radio receiving sets in an effort to prove whether the electric railway operation was actually causing this interference.

The interference under investigation was generally referred to as the "rock crusher." It is something like heavy static. The interference covers the entire broadcast frequency band, having a maximum at approximately 1,000 kilocycles (300 m.). The noise appears suddenly and lasts for intervals varying from a few seconds to several minutes, at the end of which time it might stop suddenly or die off slowly. It was much less severe after nightfall.

Investigation showed that the interference covered a very wide area. An increase in its intensity was noted as the portable set was moved under any wires, but was much more severe in the vicinity of the trolley wire. All efforts to connect the noise with the movement of individual cars was unsuccessful. It was decided that perhaps the interference noted at a given point was the result of disturbances set up by several cars which might be some distance away. To determine this, tests were made at night when there was only one car on the line.

At that time it was noted that the characteristic noise started and stopped in synchronism with the movement of the car with power on the motors. It was noted that the air compressor motor caused a continuous roar, although of but mild intensity, as long as it was in operation.

COMMUTATION THE MAIN CAUSE

Our investigation leads us to believe that the two principal causes of this interference are the commutation of the motors and sparking at the trolley wheel. These sparks set up highly damped oscillations which are conveyed to the trolley wire, which acts as an antenna and distributing system. Power and telephone wires pick up this interference by induction and reradiate it throughout the city. The reason there is such a reduction of this interference after nightfall is probably due to the increased absorbing effect of the comparatively large lighting load of all of the cars on the line, which forms a non-inductive path between trolley and ground.

Having determined the cause of the interference, the next step in the problem was to find and apply a remedy. Two solutions presented themselves; one, to improve commutation and reduce sparking at the trolley wheel and the other to prevent the disturbances set up by these causes from reaching the trolley wire. Since the commutation was considered very satisfactory from an operating point of view, it was decided that the latter solution would be attempted.

A low pass filter was designed and installed on the roof of a car for test. It consisted of a 300-micro-henry inductor connected in series with the trolley lead and an 8-microfarad electrolytic condenser connected between the car side of the inductor and ground. The theory of its action is to provide a low-impedance path for the direct current between trolley and car and at the same time offer a high impedance to the high-frequency currents between car and trolley and shunt them off to ground through the condenser.

The tests, made on a section of the trolley line which could be isolated from the rest of the system, showed that the filters eliminated about 80 per cent of the interference. It was observed that when a car without a filter entered this section of the line it caused severe disturbance all the time it was operating, although the car was at times more than 1½ miles from the observing point.

In order to facilitate further investigation a car was jacked up in the carhouse so that one pair of motors could be operated. A single-wire antenna about 40 ft. long parallel to the trolley and about 3 ft. from it was connected to a six-tube Atwater-Kent radio receiving set. Operating one motor at a time, it was observed that No. 1 motor caused severe interference when rotating in one direction and practically none in the other. On the other hand, No. 2 motor caused practically no interference when rotated in either direction. On examining the wiring diagram it was noted that the main series field of motor No. 2 was permanently connected between the armature and trolley. The main series field of motor No. 1 was permanently connected between armature and ground, but it was found that the commutating field was connected between armature and trolley when the motor rotated in the direction which caused no interference. As an experiment, the main series field of motor No. 1 was connected between armature and trolley. Under these conditions motor No. 1, and in fact both motors simultaneously, could be rotated in either direction with practically no interference. It is concluded that either the main series field or commutating field will act as a filter which prevents the commutator disturbances from reaching the trolley. It is impossible so to connect motors 1 and 3 with their main series fields between armature and trolley without adding another unit switch because of the system of tapped field control employed.

In preparing for the tests in the carhouse a new filter had been designed and constructed and installed on the car. This new filter was of a type similar to that described except that it had three stages; i.e., three 100-micro-henry inductors in series with the trolley lead and three 2-microfarad condensers connected respectively between the car end of the inductors and ground. The filter was very efficient, eliminating practically all noise from the main motors and from the compressor motor.

In order to make the test more conclusive this filter was installed on another car which was tested under operating conditions when it was the only car on the line. The filter was so installed that its various units could be cut in or out separately, permitting a number of comparative tests in rapid succession. The tests indicated that the more stages employed the more perfect the elimination of the interference produced by the motors. It was also found that a large radio-frequency choke (all three inductors in series) without any condensers was quite effective, but not as good as when the condensers were used.

It so happened that the car used on this test had one trolley wheel which produced much greater sparking than did the other. One caused but little interference, but the other, which sparked badly, caused quite a considerable amount. A filter such as that described had practically no effect on the disturbances from this cause. It is believed, however, that if the interference from the motors is eliminated the sparking wheel will cause little or no trouble.

There was one effect noted which has not as yet been clearly explained and that is that there seems to be a certain amount of interference produced when the power is shut off a moving car and the brakes are applied hard, causing rapid retardation. There is little or no interference while coasting. If the trolley pole is pulled down there is no interference, even though the car is rapidly slowed down.

The same type of car was used in all the tests. It is equipped with four Westinghouse 514-A-3 motors with tapped field control. We have a number of two-motor cars which are also producing a considerable amount of noise. An examination of the car wiring diagram shows that the main fields of these motors are permanently connected between armature and ground. Even though it were possible to reconnect all the motors so that the main series fields were connected between armature and trolley, it is believed that better results could be obtained at lower cost by a good filter.

With the proper use of filters it has been found possible to eliminate the major portion of the interference caused by electric street railways. Our trial test was made just a short while ago, consequently we have not as yet installed these filters on our cars. The results of all our tests are now in the hands of G. W. Cattell, radio engineer of the U. S. Navy Department, who has co-operated and assisted us to the fullest possible extent in the investigation and solution of this problem. He is now designing the final form of filter, which will be built and installed on a number of our cars which operate on one line. Careful observations will be made of the results obtained to determine what action will be taken in regard to equipping the rest of the cars.

"Traveling Billboard"—Illinois Traction Advertising Medium

THE Illinois Traction System was well represented at the Greater St. Louis Exposition during the recent three weeks exhibit at Forest Park. Its booth was located on a prominent corner, and a background of an illuminated cyclorama showed the Illinois Traction System territory as well as a map indicating the advantage to automobilists of using the McKinley Bridge across the Mississippi River at St. Louis. The booth was in charge of representatives of the traffic department of the Illinois Traction System and of the St. Louis Electric Bridge Company. An odd method of advertising, this attraction was adopted by the Illinois Traction System, with the co-operation of the St. Louis Chamber of Commerce, in sending a special advertising car over the company's lines in Illinois. This car was covered with two 40-ft. signs and traveled more than 600 miles in Illinois. Upon arrival in a city or town the car was heralded by a special type of siren whistle, and the newspapers were informed about the car and its purpose.

Tractive Effort Increased with Three-Motor Truck

BY E. B. GUNN

DUE to several heavy grades on the lines of the Western Ohio Railway, running between Piqua and Findlay, Ohio, this railway required heavier equipment than the present four-motor freight cars that are being operated. A new departure in truck building resulted when the Cincinnati Car Company built a truck with three axles so that three motors could be mounted on each truck, or six motors per car. In May of this year the railway started a test with this type of truck by mounting six Westinghouse 56 motors under one of its cars. These particular motors were available from some of the company's heavy interurban passenger cars.

Freight Car of the Western Ohio Railway Equipped with Six Motors and Twelve Driving Wheels

The use of this six-motor equipment necessitated the design of a new controller with groupings to take care of the six motors. The General Electric Company brought out improvements to its K-64 controller to take care of this condition. A line breaker was added to take care of the increased current and to provide for breaking the circuit outside of the platform controller. A commutating switch was also added to change the grouping from low to high speed.

These equipments were placed in service under one of the company's regular freight bodies and have been working very satisfactorily. Through their use the car can pull two extra trailers over the severe grades. The energy consumption is very low, considering the length of trains that are being hauled, and this type of equipment has been found particularly easy on substations. The truck has been able to operate around short radius curves in an entirely satisfactory manner, and the added tractive effort has proved of great advantage. Couplers are mounted directly on the truck and therefore the center of the coupler is practically in the center of the track at all times. Brakes have been installed on all twelve wheels of the car, which makes for very effective braking.

Storage, Handling and Protection of Lubricants

Central Oil House Desirable Where Large Volume of Lubricants Is Handled—Proper Construction Makes Danger of Fire Almost Impossible—Location Near Railroad Siding or Street Reduces Handling

By Allen F. Brewer
Mechanical Engineer and Editor "Lubrication," the Texas Company, New York, N. Y.

MAINTENANCE of street cars and motor buses is far more of a problem than maintenance of steam turbines, engines, pumps, etc., in the power plant. With the latter, failure of bearings will, of course, be more costly from a replacement point of view, but attendant labor can be better supervised and more carefully trained to the importance of lubrication. The motorman or chauffeur, on the other hand, is left to himself on the road. If he profits by the teachings of the "chief," fine; if he is careless or negligent, the garage or carhouse mechanic will probably work overtime on bearing replacement, etc., which may send the cost of maintenance soaring, if enough of this occurs.

Effective lubrication starts with the methods and means of storage in the carhouse or garage. To direct our efforts toward the selection of the most suitable products, and then allow them to stand in open containers, exposed to perhaps the weather, and almost surely the dust, dirt and moisture conditions of the average shop, will be decidedly poor policy. For lubricants can only be dependable in proportion to their purity. As received from the refinery they are pure, if bought under a dependable trademark. It is, however, up to the consumer to keep them as nearly as possible in this condition, until used, and in certain conditions, during use. Proper storage equipment, well-defined oil-house rules, education of employees, and the use of certain oil purification equipment will be excellent insurance against the carelessness of operators or mechanics, and the possibility of the development of excessive maintenance costs.

FACTORS INVOLVED IN HANDLING LUBRICANTS

In general, the storage and handling of lubricants will involve a number of factors which must be given consideration, such as: (1) The construction of the oil house or oil room; (2) the storage tanks and their accessory equipment, such as heating coils, etc.; (3) the equipment installed for the handling of the products and shipping containers; (4) the provisions for measuring oils in order to enable a suitable record to be kept; (5) the manner in which the oils are distributed; (6) the extent to which semi-solid lubricants are to be used; (7) the manner in which the oil house is to be managed, and the kind of records kept.

The primary requisite for any electric railway using a considerable volume of lubricants is a central oil storage house, or at least a special room in some part of the garage or carhouse from which lubricating oils and greases can be issued as needed, and in suitable though not excessive quantities. In turn, all new supplies of such oils should be delivered there for storage until required. Whether or not the expense of constructing an independent oil house is justified will depend largely upon the amount of rolling stock involved.

Of course, there will be considerable expense attached to such an installation. For this reason, therefore, many plants which are adjacent to oil supply depots frequently set aside a corner of the garage or carhouse for the storage of lubricants, and keep these latter in the shipping containers until they are empty, when they are forthwith returned to the oil dealer.

A Battery of Lubricating Oil Storage Tanks with Barrel Truck Along Top and Measuring Pumps in the Rear

The natural objection to storage in this manner is that there will be considerable possibility of contamination of the lubricants. Such localities are often very carelessly hosed or cleaned out, with the result that dirt will be swept into the drip pans and measures. There will also be considerable chance for leakage and wasting of oils in such a room, unless an unusually careful employee has sole and complete charge and keeps it locked and inaccessible to others.

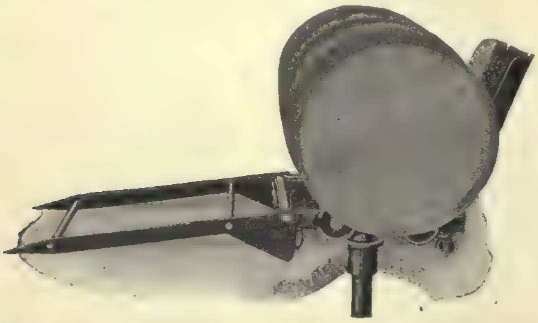
An oil house or oil room should, whenever possible, be of fireproof construction throughout, with brick, tile or concrete walls and floor and a tile, metal or slate roof or ceiling built on steel beams or rafters. The floor should be fitted with drains. The danger of fire in a modern oil storage house will usually be practically negligible; yet constructional features of fireproof nature are the best sort of insurance, and first cost, unless prohibitive, should not be dickered over.

In addition, cleanliness will be more easily maintained in such a building or room than in one where woodwork is used, which would soon become splashed and oil-soaked.

Doors and windows are another factor requiring consideration in oil-house construction. Best practice recommends as few of these as possible, and those that are necessary should be of steel frame or roller type, fitted with wireglass and automatic closing devices. Suitable fire-extinguishing equipment should also be installed.

LOCATION OF THE OIL HOUSE

Considerable thought should be given to the location of the oil house or the part of the store-house or garage, etc., which is to be set aside for conversion into an oil room. An appreciable amount of time will always be lost in the laborious handling of heavy oil containers. There is also considerable possibility that damage will result both to lubricants and containers if the latter are rolled or tumbled about unnecessarily. So our first thought should be to locate the oil room or house as close as possible to the railroad siding, dock or street. Thus the containers will not be subject to any more handling than absolutely necessary in their transference from cars, boat or auto truck to the point of storage.



This Type of Skid and Barrel Drainer Is of Great Assistance for Emptying Contents of Barrels

Where handling of filled containers from one level to another is involved, hoisting is necessary. Hoisting is expensive; in addition, it entails a certain amount of severe handling of the containers which may easily lead to contamination of oils or greases through sprung seams, etc.

Wood barrels especially will suffer, and warped and cracked heads, or the jarring loose of particles of the glue lining, will often occur. Any damage to the container which may break the seal and lead to contamination of the contents through entry of water or foreign substances is a serious matter.

To overcome these objections "one level" handling is advisable. In other words, the platform of the oil house or storage room should, as nearly as possible, be on a level with the car floors or dock, or, where containers are to be delivered by auto truck, on a level with the floor of the average truck.

As a result of such construction, containers can be rolled, trundled on hand trucks, or handled by a portable conveyor, directly from the delivering medium to the filling hatch of the storage tanks, where this is located at the floor level, or to the hoisting device about the tanks if they extend above the floor.

In any system the type, number and size of storage tanks that may be necessary will depend upon the volume and nature of the lubricants that are to be stored. In general, where a new oil house is to be constructed it will usually be practicable to build it with a basement, and provide for location of bulk storage tanks therein; the main floor in such a house would thus serve as the receiving and delivering room, the tops of the tanks projecting above the floor or not, according to the type of house.

The number of tanks required will depend upon the number of different grades of lubricants used. In every case the rate of consumption involved should be considered. Where, for example, only small quantities of certain products are to be stored for any length of time, in the interest of economy of space and expense, it will be best to keep them in the shipping containers over the period of storage, rather than plan to transfer them to more permanent tanks.

There are two general methods by which fluid lubricants can be delivered, and which must be considered when planning for storage tanks. They are: (1) Bulk delivery by tank car, truck or boat, and (2) package delivery in steel drums, barrels or cans.

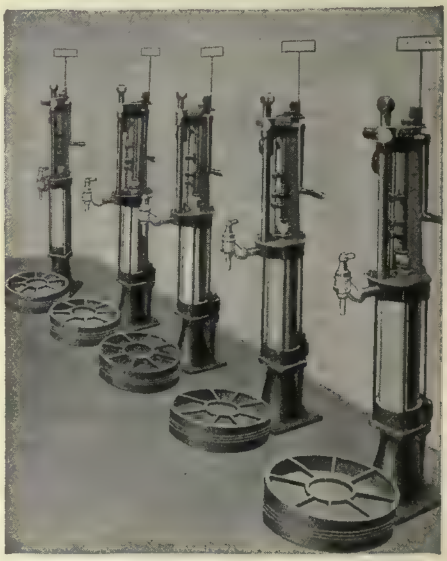
Where bulk delivery is involved, the location of the tanks with respect to the delivery level is naturally important. Usually in such plants the oil is transferred from the tank car or boat through a hose connection. To facilitate matters and reduce expense, gravity flow should be taken advantage of by locating the tank filling hatch below the level of the outlet valve of the tank car.

Care must be taken in the location and operation of valves, when pumping is necessary, inasmuch as where a number of tanks are involved there will be possibility of drawing some cheaper grade of oil into the suction line to contaminate a more highly refined product. Interconnecting valves should be tightly closed before pumping is begun.

Package delivery, as the shipment of lubricants in drums, barrels, or cans is usually termed, will also be facilitated if gravity is utilized to the fullest extent.

TEMPERATURE CONTROL DESIRABLE

Certain lubricants can be handled most effectively where absolute control of oil-house and tank temperatures is possible. Therefore, thermal conditions should be studied in planning storage-tank location in either an oil house or an oil room.



Ample Drains from Lubricating Oil Pumps Insure Cleanliness and Prevent Waste

Wherever heavy, viscous products, such as greases or gear lubricants, are to be stored the oil house or oil room should be equipped with heating coils, especially where climatic temperatures may vary over a wide range. For this reason many storage tanks for lubricants are built similar to fuel oil tanks, with heating coils within. In such installations the coils should always be composed of bent pipe, and no pipe junctions or fittings should be present within the tanks owing to the danger of water, or boiler compounds contaminating the lubricants in event of steam leaks at pipe joints, etc.

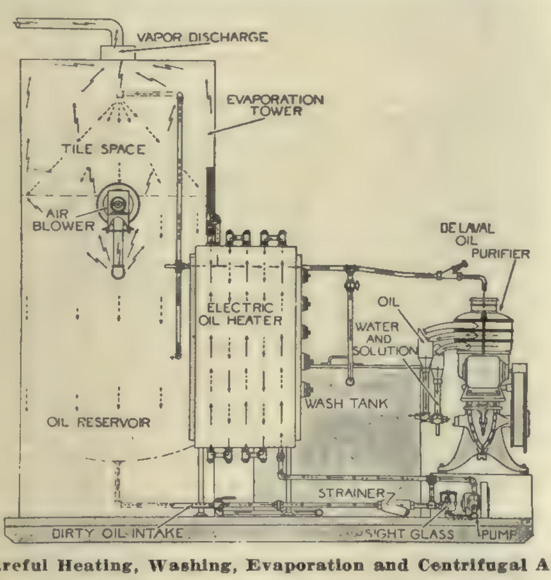
The better practice, however, is to install steam heating coils in the storage room itself or surrounding the tanks. Thus temperatures can be accurately regulated, overheating will not be so apt to cause damage to certain products, and heating can be economically carried out by the use of exhaust steam in many cases.

Horizontal location of all larger tanks will always be advisable. Thus the maximum distribution of load on the foundations will be obtained. The possibility of settling will thereby be decreased, and excessively heavy footings and foundations will not be as necessary to carry a load which is relatively widely distributed. This is assuming that the ground on which they are to be built is solid and not prone to settle.

To insure complete rigidity, the tanks should always be securely anchored to their foundations—never just rested upon the latter. This will be especially essential in localities where floods, earth movements or explosions, etc., are possibilities, the occurrence of which might disturb the location of tanks and cause broken pipe connections, damage to floors, and loss of oil through probable leakage.

In practically every storage room certain accessory equipment will be necessary for the handling of lubricant containers and the lubricants themselves. This will include pumps, meters or other measuring devices, portable elevators for hoisting or lowering drums, etc.

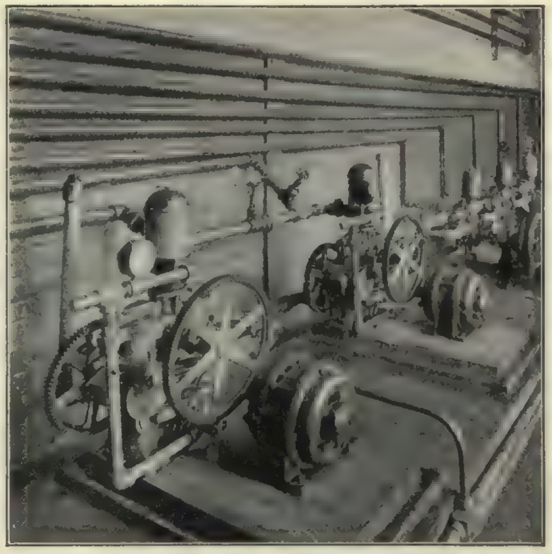
Measuring pumps will save considerable time and labor, will enable the oil-house or oil-room attendants to fill orders promptly, and will insure that the oils are kept free from contamination and in their original state of purity, until drawn into the distributing containers for use on equipment.



By Careful Heating, Washing, Evaporation and Centrifugal Action Oil Can Be Reconditioned for Reuse

The value of orderly oil-house operation, and properly kept records of daily, weekly and monthly oil consumption cannot be underestimated. The effect on the morale of the personnel and the economies in consumption of lubricants that can be attained will be surprising where employees must follow a definite procedure in the obtaining of their necessary oil supplies and where an accurate record is kept of their consumption.

The hoisting of barrels or drums above storage tanks, or to emptying racks for transference of their contents, will render it advisable to install a portable elevator for this purpose, to eliminate handling and probability of damage as much as possible. Modern practice is to extend a suitable track along the tops of all tanks that are to be filled from barrels or drums, at a sufficient height above them to facilitate location of the bungs directly over the filling hatches, and reduce the possibility of waste. Containers can then be hoisted to this track level, rolled into position above the respective tanks to be filled, and emptied of their contents rapidly, completely and with comparatively little labor.



Battery of Power Pumps for Handling Oils in Bulk

The manner of distribution of lubricants from the oil house or oil room to various parts of the carhouse or garage is important in that it involves the element of lost time on the part of the employees who are to deliver the oils and greases. So this should essentially be studied as a labor-saving problem; although, on the other hand, prevention of contamination must never be overlooked.

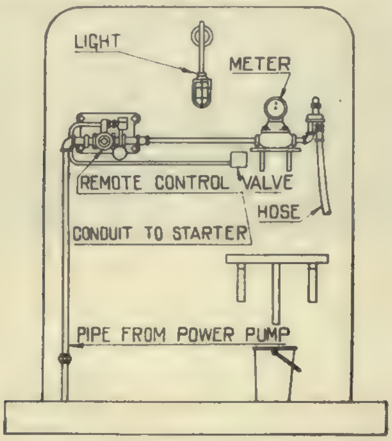
Where auxiliary storage in individual departments is to be maintained the type of containers used is important. Preferably they should be of the cabinet or portable filling station type of storage tank, fitted, where advisable, with a suitable hinged cover to afford the utmost protection of the contents. Usually such tanks are equipped with measuring pumps, and so built that any drip from the pump discharge drains right back into the tank.

The extent to which greases and gear compounds are used will be another factor that must be considered in planning the oil-house layout. In electric railway service straight mineral, non-fluid gear compounds will predominate. For the motor bus, on the other hand, greases of varying melting points according to the service required will be in the majority.

In purchasing greases, it should be a rule never to attempt to store any greater amount than actually needed, and to observe every caution to avoid overheating. It must be remembered that oftentimes the oil and soap constituents of certain greases will tend to separate more or less permanently if subjected to abnormal heat. Of course, this will cause a decided decrease in the subsequent lubricating value of the grease.

Such of these products as can be rendered fluid through reasonable heating can be handled like oils, their storage tanks being built with similar filling hatches, rolling tracks and elevator equipment. Thus, upon receipt of new deliveries in large amounts, steam heat where available can be turned on in the oil room and barrels promptly hoisted for draining of their contents with a minimum of loss into the respective tanks set aside for their storage.

Here again it is well to emphasize the importance of accurate regulation of steam flow and oil-room temperatures, especially at such a time. When such lubricants are to be transferred from shipping containers to storage tanks, whatever the atmospheric temperature, it will be necessary usually to raise their temperature (through indirect heating) often quite considerably in order to enable them to flow readily from the containers.



Convenient Arrangement for Lubricating Oil Draw-Off in Storage Room of Electric Railway

Certain gear lubricants which may be too heavy to flow with any degree of rapidity under such heating as is available must be stored in the shipping containers. In general they can best be handled by a suitable pump or a clean paddle or spoon, removing only a sufficient amount each time to fill the gear cases or lubricators.

To protect the contents of containers after the heads have been removed, and to prevent drying out of such products as greases a removable cover should always be kept tightly in place over the top. Sheet metal is considered the best material for such a cover and preferable to wood owing to its ability to insure a better seal, its resistance to warping and the ease with which it can be cleaned.

LUBRICATION SPECIALIST WILL PRODUCE MANY ECONOMIES

Greatest economy and efficiency in the storage, handling and usage of street railway and motor bus lubricants will be attained by placing the entire matter of lubrication under the supervision of a master mechanic or a capable lubrication engineer. Many larger roads have created the latter position in their mechanical engineering departments (though perhaps not in name), realizing that an able, technical petroleum specialist can save his salary many times over by reducing wastes of lubricants, loss of time, and cost of upkeep of rolling stock.

Such a job should include direct charge of the oil house or oil room. When necessary, a capable corps of assistants should be available in order that prompt deliveries and accurate records can be maintained. All lubricants should be issued on requisition only, signed by the foreman in charge of each phase of operation and maintenance, and should never be issued in excessive quantities, since this has been found conducive to waste in application, through careless handling.

Monthly oil records are of decided value and should be prepared by the lubricating staff and submitted regularly to the executives. By showing inventory of stocks on hand, and records of the amount of each lubricant used throughout the system, abnormal usage can be checked up without delay and steps taken, if necessary, to bring about correction.

CARE AND HANDLING OF CONTAINERS

Unnecessary dropping of wood barrels will tend to promote leakage at the seams by springing staves or heads. Hence, it is best practice always to use some form of portable elevator onto which the container can be rolled and then raised to the level of either the storage rack or top of the storage tank.

Storage racks for barrels and drums, if used instead of main storage tanks, should be built of steel and in such a manner that individual containers may be removed independently as desired. Barrels of heavier compounds especially should always be stored in the oil house. Otherwise excessive cold may render emptying a difficult and tedious matter.

Both barrels and drums should be stored on the side or bilge with the bung down. It is usually inadvisable to use wood barrels for lengthy storage of high-grade lubricating oils, on account of the possibility of contamination or loss from leakage or evaporation.

In handling wood barrels it must be remembered that these latter have an appreciable salvage value, and in good condition they are returnable to the oil marketers or are in demand by cooperage firms. Care should therefore be taken to prevent damage while in the hands of the buyer.

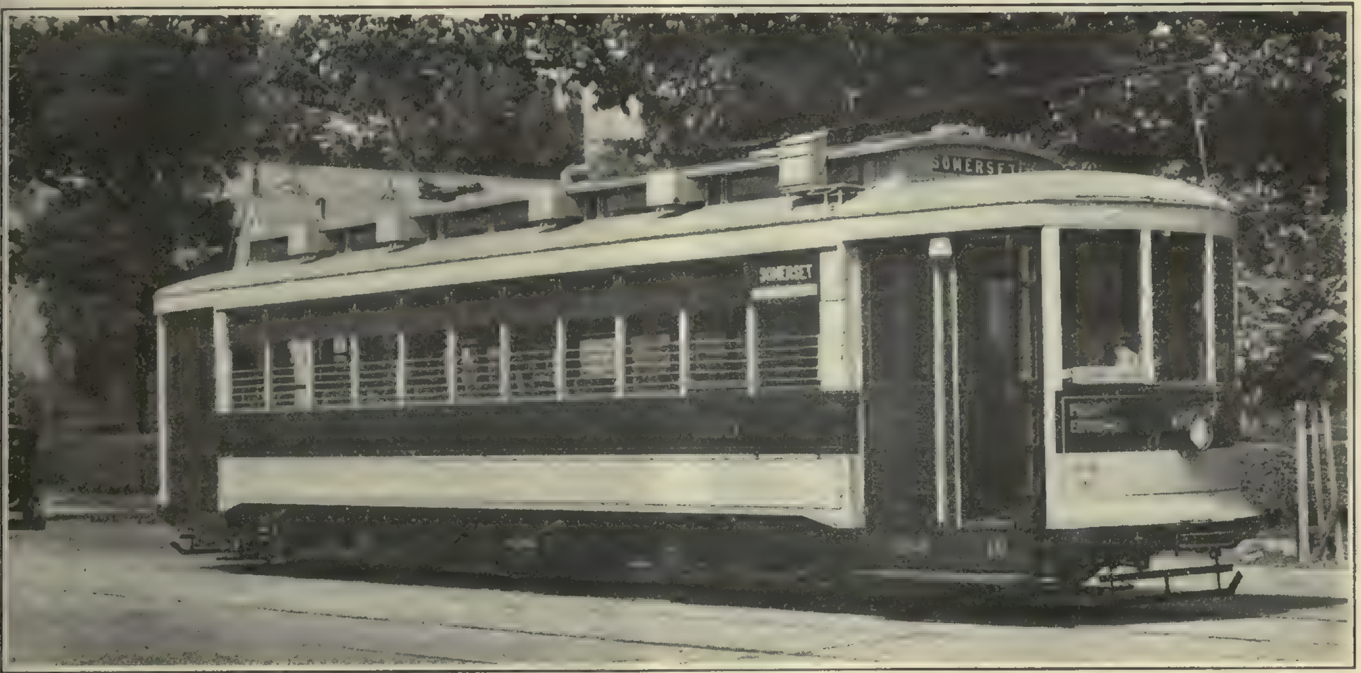
Holes should never be bored in the heads for outlet of oil or inlet of air. A bunghole should never be reamed out since this will require the use of an odd-sized bung for the next shipment, thereby decreasing the value of the empty barrel. Likewise, a bung should never be driven entirely into a barrel as this may cause the bung stave to split, and entail the possibility of particles of glue or wood being jarred into the oil to contaminate it and cause serious trouble in subsequent lubrication.

Careful handling of wood barrels will not only result in the highest value from a resale point of view, but will insure that the lubricating oils will be in fit condition to meet requirements. Bungs should, therefore, be removed by a chisel or bung pick, after tapping the bung stave lightly with a wooden mallet or bung starter.

Empty barrels should be given the same consideration as filled barrels, to prevent damage and insure the receipt of the highest price when they are sold. Wood barrels, when empty, will always be subject to warping of the staves and heads if stored on end or if exposed to the weather. This will be prevalent especially if water is allowed to collect on the heads, or where the barrels are exposed alternately to the effects of the sun and excessive dampness. A wood barrel head will split and warp readily in such a case, causing the glue to loosen and necessitating complete reconditioning of the barrel before it can again be used.

Washington Cars Embody New Color Scheme

Wisconsin Avenue Line Now Has Fifteen de Luxe Cars for One-Man Operation—No Expense Has Been Spared in Making These Units the Last Word in Modern Car Construction



Some Time Ago the Railway Officials Promised to Bring About an Improvement in Service. These New Cars Are Visible Evidence that Their Efforts Have Borne Fruit

FULFILLING a pledge made by W. F. Ham, president of the Washington Railway & Electric Company, to render a "real street railway service" to the citizens in the area served by the Wisconsin Avenue line, fifteen new de luxe street cars have just been placed in service over that route. This has been done in spite of the fact that the Wisconsin Avenue line has never proved to be a profitable one. It is anticipated, however, that the high type of service which the new cars will render will attract increased patronage.

Many attractive features mark the new equipment, not the least of which is the new cream and blue color scheme which has been adopted in decorating the Wisconsin Avenue cars. It is doubtful if any citizen of Washington could be unaware of the passage of one of these new cars down the street, as their cream painting surmounted with an encircling band of royal blue on the exterior makes a very striking sight. In this respect the cars are similar to the Air Line coaches the company is now operating on Rhode Island Avenue.

Built by the J. G. Brill Company of Philadelphia, at a cost of $15,366 each, the cars lack nothing in appearance or in comfort from the standpoint of the passengers. The interiors are finished in natural cherry, with white enamel and Quaker gray trim, and seem to radiate an air of cheery comfort. The broad, deep seats are of genuine leather equipped with cushion springs, providing comfortable riding space for two persons, while the aisle of the car is wide and easy of passage. The floor is covered with attractive rubber tiles in soft browns and reds, presenting a safe and comfortable footing for passengers and of an attractive appearance. The rubber tiling serves the further purpose of deadening truck and body noises and may be cleaned easily.

The cars seat 49 passengers and are equipped with semi-rigid handholds with brown enamel grip, to accommodate additional standing passengers. Ventilation of the cars has had very careful attention by the company engineers. Eight automatic exhaust suction type ventilators furnished by the Railway Utility Company have been installed to insure a full passage of clean air at all times. In winter the cars are heated with individual automatic heaters placed under each seat, and the mean temperature of the interior is regulated by thermostatic control.

Practically every type of safety device has been incorporated in these cars with a view to demonstrating that one-man operation is fully as safe and feasible as two-man operation. In fact, the Washington Railway & Electric Company was confronted with a storm of criticism some time ago directed at its one-man cars which were then in operation in the capital, and at that time the company offered to substitute fifteen of these latest type one-man cars in place of a similar number then in operation. Thoroughly to convince the public of the efficacy of the new equipment, a souvenir leaflet was issued to all persons riding on the cars. This booklet, entitled "The Cream and Blue," thoroughly describes the construction and enumerates the advantages of the new cars and further goes on to emphasize the proper manner to board and leave the cars. It is the belief of the management that antipathy toward one-man cars is largely due to ignorance concerning their advantages and characteristics, and this ignorance the company has attempted to dispel by efficient publicity on the subject.

No Lack of Attention to Detail Occurred in Designing the Interior Fittings

In addition to dead-man control, which is practically standard on modern one-man cars today, the new Wisconsin Avenue units are equipped with Westinghouse variable load brakes which automatically maintain an even braking effort regardless of the passenger load.

Wide, large doors permit of easy access at the front entrance of the car and provide an exit at the rear end through the operation of the automatic treadle which is used to operate the rear exit. Considerable emphasis has been placed upon the matter of front entrance and rear exit by the company, and it appears that the riding public is gradually becoming educated to this plan. The front doors are automatically controlled from the operator's valve handle.

The cars are provided with brilliant illumination, there being thirteen lamps placed in the interior and on the platforms, the latter providing a well-lighted space when entering and leaving the car, while an additional lamp is placed on the exterior of the cars at the doors to light up the step and additional roadway space when alighting at night. The latter feature is of considerable importance where vehicular traffic is heavy, since the light provides both a warning to passing motor cars and an aid to car riders.

The induction into service of the new cars is made coincident with the completion of the new trackwork on Wisconsin Avenue by the railway. This work covered the complete rehabilitation of the tracks on this avenue and entailed an expenditure totaling $285,000. The new equipment, costing approximately $231,000, added to the track rehabilitation costs represented a total outlay of $516,000.

The principal specifications on the fifteen new cars are shown in the accompanying table.

$12,654,135 in St. Louis Savings & Loan Deposits

REPORTS of the Savings and Loan Association affiliated with the United Railways, St. Louis, Mo., indicate continued activity during the year 1925, encouraging thrift and promoting home owning among the employees of the railway.

Real estate loans to the number of 285 were made to members to buy or build homes, this being at the rate of a loan a day, 5½ days a week.

Cash receipts of the association for the year were $2,476,646, or at the rate of $8,659 a day.

During the eleven years since its organization the association has received and handled deposits from its members aggregating $12,654,135.

It has financed the building or purchase of 1,017 homes by loans, aggregating $5,297,730; 659 of these loans, aggregating $1,664,048, or 31½ per cent of the total, have been paid off (notwithstanding employees are allowed 140 monthly installments or nearly twelve years to pay off, if they desire), leaving 1,258 loans, aggregating $3,633,682, still in process of payment.

The membership is now 5,662 (a net increase of 233 over a year ago); the assets, $3,660,575, with a contingent fund reserve of $156,354.

Dividends of 6 per cent compounded semi-annually amounting to $651,927 have been paid to members since organization, of which $165,413 was paid during the year 1925.

The authorized capital stock of the association is $10,000,000, represented by 50,000 shares at $200 each, of which there were outstanding on Dec. 31, 1925, 48,199 shares of a par value of $9,639,800.

PRINCIPAL SPECIFICATIONS OF WASHINGTON'S NEW CARS

Date order was placed	Feb. 17, 1926	Air brakes	Westinghouse Traction Brake Co.	Heater equipment	Railway Utility
Date of delivery	June 1 to 15, 1926	Axles	Hammered steel, annealed	Headlights	Crouse-Hinds WDF
Seating capacity	49	Bumpers	Anti-climber with pull socket	Lightning arresters	General Electric
Weights:		Car signal system	Faraday	Motors	GE 265-A, outside hung
Trucks	11,500 lb.	Car trimmings	Statuary bronze	Paint	Hildreth
Total	40,200 lb.	Center and side bearings	Brill	Registers	International
Bolster centers	19 ft. 0 in.	Conduits and junction boxes	Cable boxes	Sanders	Ohio Brass
Length over all	42 ft. 3 in.	Control	K-31	Sash fixtures	Curtain Supply Co.
Truck wheelbase	4 ft. 10 in.	Curtain fixtures	Curtain Supply No. 88	Seats	Brill 201-B
Width over all	8 ft. 8 in.	Curtain material	Pantastote, double faced	Seating material	Brown leather
Height, rail to trolley base	11 ft. 8¼ in.	Destination signs	Keystone	Springs	Brill
Body	Semi-steel	Door mechanism	National Pneumatic	Step treads	Brill
Interior trim	Natural cherry	Fare boxes	Cleveland	Trucks	Brill 76-E-1
Headlining	Agasote	Fenders	Providence	Ventilators	Railway Utility
Roof	Monitor	Hand brakes	Peacock staffless	Wheels	Davis cast steel, 30 in

Stockholm-Göteborg Electrification Recently Completed

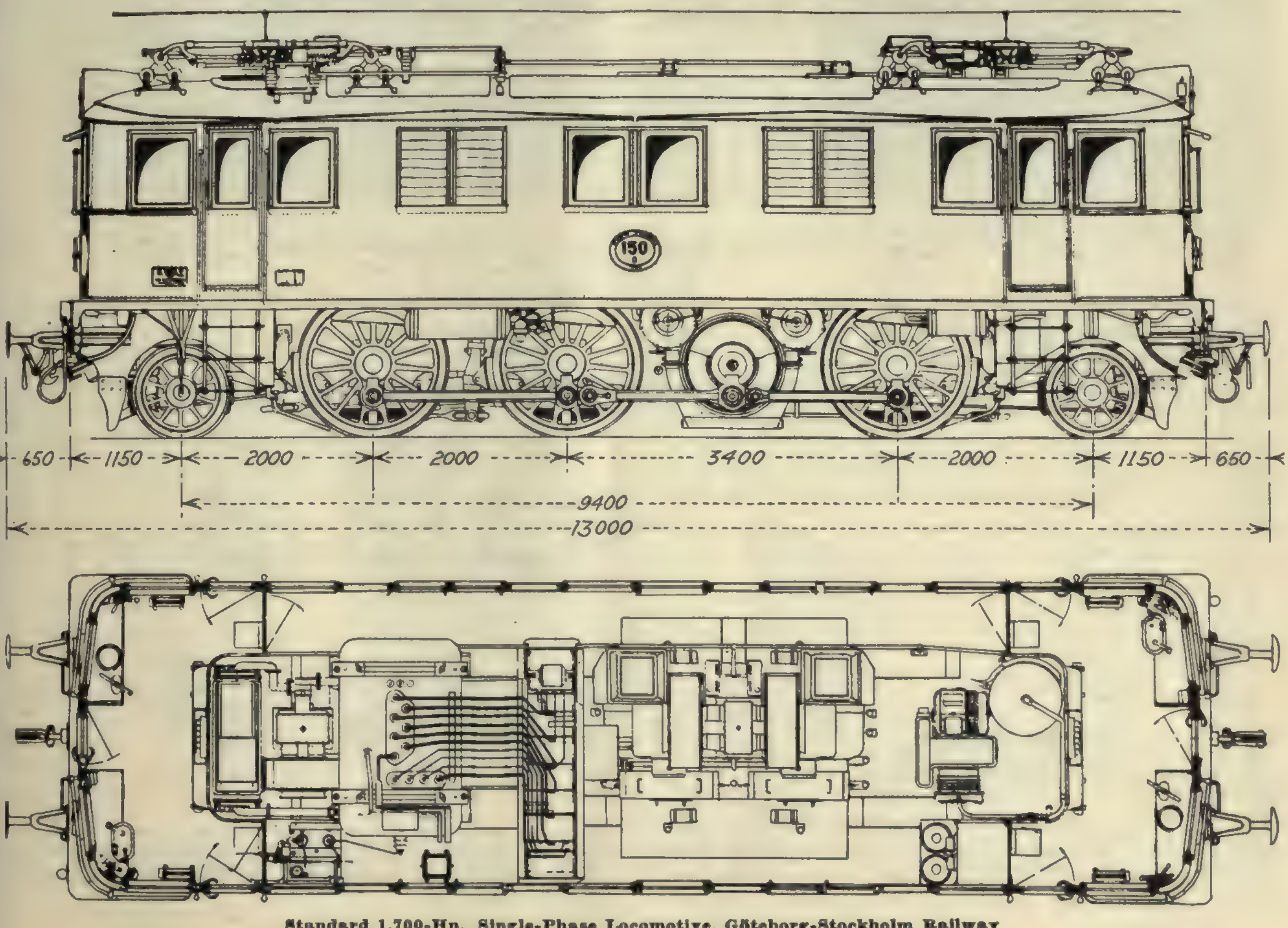
This Is the Most Important Railway in Sweden and Has Been Equipped with the 16⅔-Cycle, Single-Phase System—Power Is Taken from Existing 50-Cycle, Three-Phase Circuits and Transformed for Railway Use in Substations—Crankshaft Locomotives Are Used

By Dr. F. Neithammer
Prague, Czechoslovakia

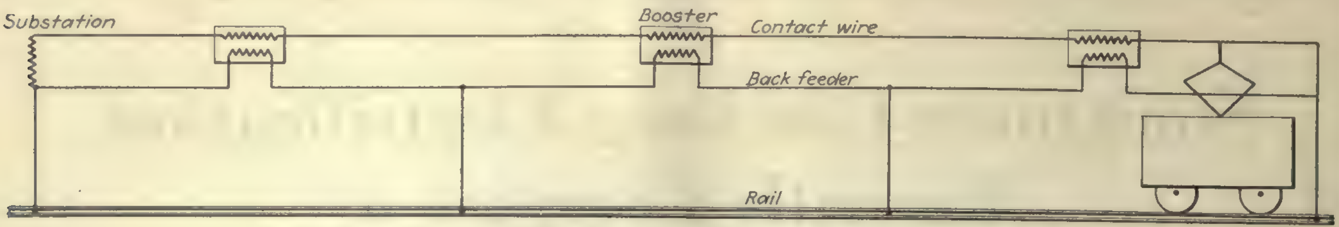
ELECTRIFIED railway service between Stockholm and Göteborg, the two largest cities in Sweden, began operation the end of May, 1926, and I had an opportunity to study it thoroughly in June. This railway electrified a length of 458 km. (284 miles) with a ruling grade of only 1 per cent and a minimum curve radius of 500 meters (1,640 ft.).

Power is obtained from hydro-electric stations at Trollhättan, Lilla Edet, Alvkarleby and Motala and from a steam station at Västeras. These are existing three-phase, 50-cycle stations distributing power for general commercial use over high-tension lines and are under the direction of the Royal Water Power Board. Energy from them is delivered at 50,000, 70,000 and 130,000 volts to railway substations, of which there are five between Stockholm and Göteborg. Here the electrical energy is converted by motor-generators to 3,000-volt, 16⅔-cycle, single-phase current which is stepped up for the trolley contact line to 15,000 volts. Two of these substations are equipped with three of these frequency changer sets, consisting of a motor rated 3,200 kw. at 70 per cent power factor, a single-phase generator of 2,400 kw. at 80 per cent power factor to stand heavy overloads and a static oil transformer of 2,400 kw. at 80 per cent power factor. The three other substations contain only two sets of the same size.

These sets, built by the ASEA Västeras, have only

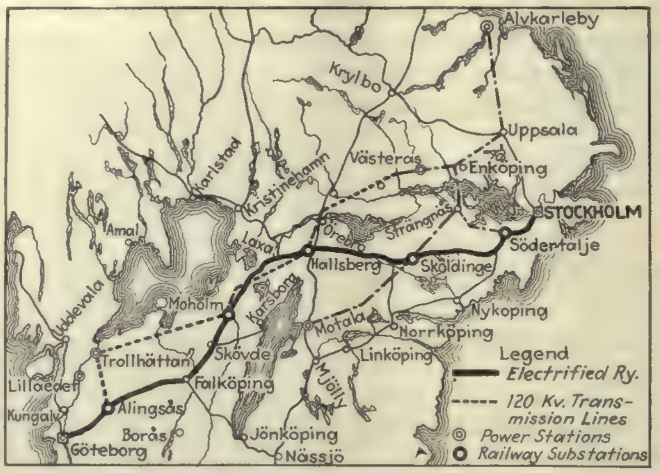


Standard 1,700-Hp., Single-Phase Locomotive, Göteborg-Stockholm Railway



Wiring Diagram Showing Use of Boosters for Equalizing Drop in Return Circuit

two bearings and possess a combined efficiency at full load as high as 87 per cent. The 50-cycle, three-phase machine has exactly the same outside dimensions as the single-phase, 16⅔-cycle machine, as shown in the substation plan, which gives the unit an excellent appearance. Possibly the single-armature Bergmann frequency changer with a single rotating field for 50 and 16⅔ periods would be even more advantageous.



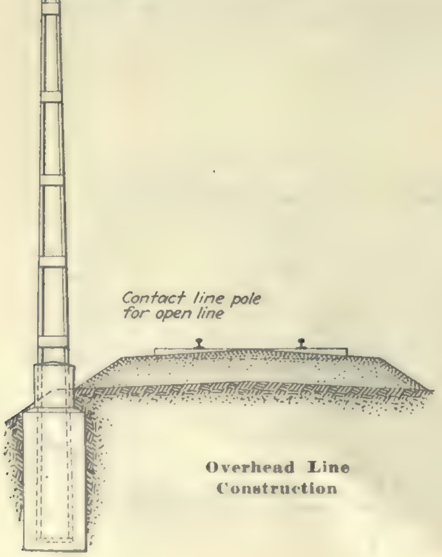
Map Showing Electrified Line, Generating Station and Substations

Catenary construction is used, with side brackets and hinged pull-offs for the contact wire, as shown in one of the illustrations. The catenary is fitted with counterweight adjustment. A lighting line is carried on the top of the pole, and further down is an insulated return wire which is connected to boosters or suction transformers and to the rails as shown in the wiring diagram. These connections to the rails are made alternately at distances of 1.4 or 2.8 km. to each rail and no rail bonds are used. These boosters equalize the voltage drop in the rails and thus reduce any disturbances in the telephone, telegraph and signal lines along the right-of-way. As a further precaution, 25 pairs of telephone and telegraph wires have been combined in a cable which has been laid underground.

LOCOMOTIVE EQUIPMENT

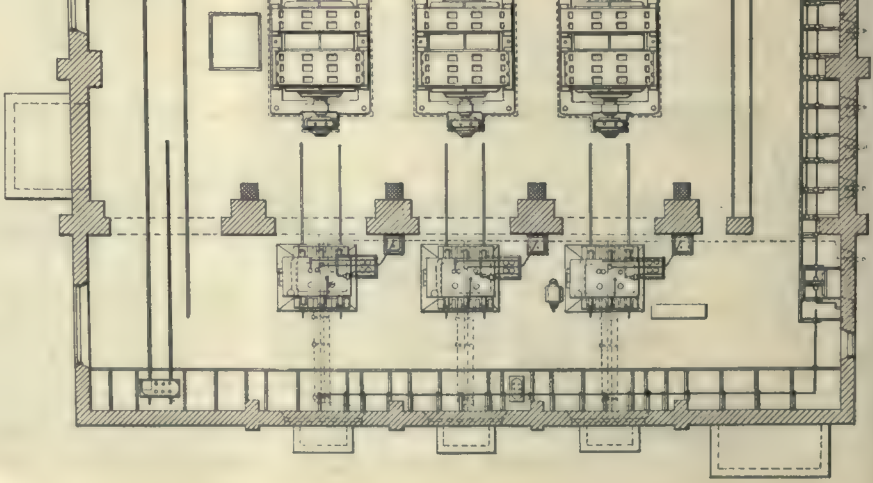
The locomotive equipment for the new electrified line consists of 50 ASEA units of the 1-C-1 type. Each has a total weight of 79.5 metric tons with a weight of 51 tons on drivers, and a capacity of 1,700 hp. The maximum speed is 90 km. (56 miles) per hour. The motor equipment consists of one pair of twin motors, geared to a jackshaft which drives the three axles by connecting rods as shown in the accompanying drawing. Tests with this simple method of drive show that a much greater train load is required to slip the wheels than with individual axle drive. The motors are of the straight series type with forced ventilation. The freight locomotives are identical in design with the passenger locomotives except that a different gear ratio is used.

The main transformer on the locomotive is of 1,490 kva. capacity. It is of the shell type with oil insulation and ventilated oil cooler, and reduces the voltage



Overhead Line Construction

Railway Substation with Motor Generators for Changing 50-Cycle, Three-Phase, to 16⅔-Cycle, Single-Phase



from 15,000 for the driving motors. Taps are provided giving from 168 volts to 840 volts for the main motors and 215, plus or minus 10 per cent, for the auxiliary motors. Multiple-unit control for the motors is obtained with electromagnetic contactors operated from a storage battery. I was informed while in Sweden that these single-phase locomotives cost no more than would have been charged for a corresponding number of 3,000-volt d.c. locomotives of the same capacity.

DEPARTURES FROM PRIOR SWEDISH PRACTICE

In taking electric energy for the operation of the line from existing stations the railway authorities have departed from the principle followed on the Riksgräns Railway in the north of Sweden, which has its own power station. While results from this railway have been good, a notable reduction in capital cost follows the use of existing stations, and there is no reason to expect anything but satisfactory results. The station load factor is much better when the power is taken from central stations, and the load variation from railway operation has no disturbing effect on the rest of the output. In fact, the use of the synchronous machines in the railway substations should have a very favorable influence on the power factor of the general distribution system and may bring it up to about 90 per cent. This alone produces an advantage that should have great appeal to central station companies.

A gain of this kind has been found to follow the use of motor-generators for commercial service in Stockholm and Göteborg, in which cities three-phase current is changed to direct current for general distribution.

The Swedish Railway electrification seems to represent the most economical plan to follow in such installations where the single-phase system of distribution has been selected. From observation it does not appear to be materially inferior to the best direct-current electrification. Of course, factors may develop through the maintenance angle that will take some years to determine and which may prove to be important considerations.

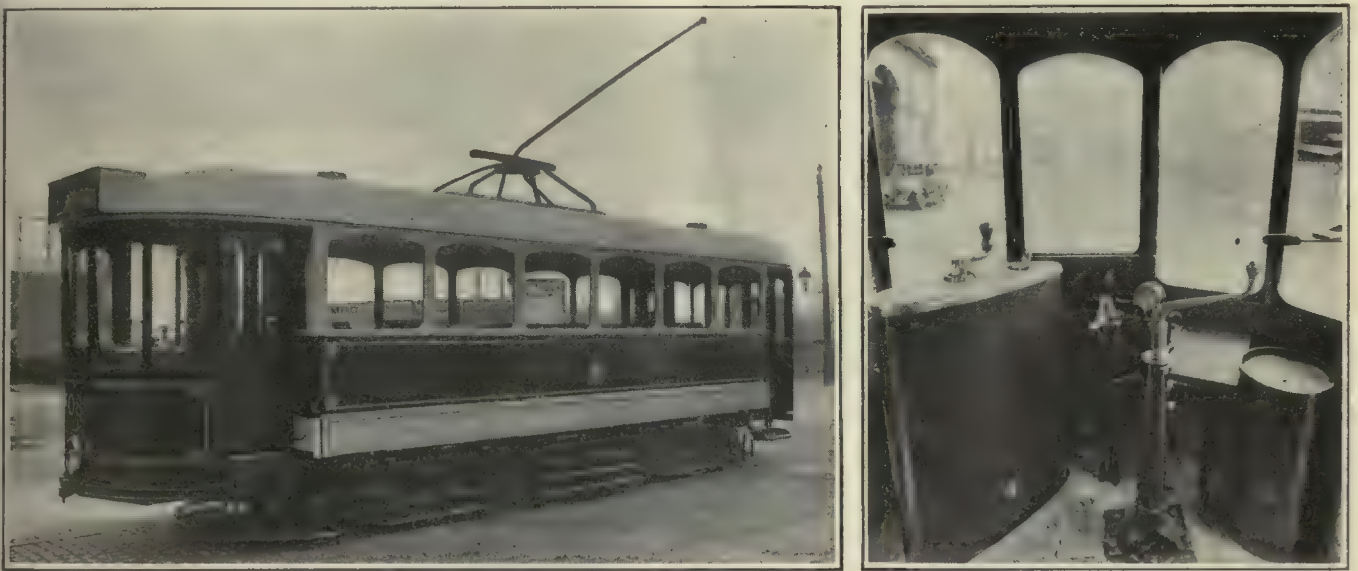
The Norwegian railways use the same electric system for the operation of the railways of that country as that in Sweden.

Experimental Car at Glasgow Follows American Design

Single-Deck, Double-Truck Car Is Equipped with Four Motors to Give Increased Speed and Combat Bus Competition

INCREASING pressure of bus competition, begun about two years ago, has led the Glasgow Corporation Tramways management to make several experimental departures from its usual practices. For years the four-wheeled, double-deck, top-covered car has been standard with practically no modifications. Recently, however, a single-deck, double-truck car has been built and three of the ordinary four-wheeled, double-deck cars have been equipped with different types of trucks and motors.

In the early days of electric traction in Glasgow a few single-deck cars, of a type now quite obsolete, were tried, but failed to meet with much public favor. Moreover, the double-decker had the advantage of being able to seat more people, and thus came into general use. The advent of the bus, however, has somewhat changed public taste in this matter, as many of the buses running into and out of Glasgow are single-deckers, and it has been decided to make a new trial of the merits of the single-deck tram car.



Many Features Characteristic of American Electric Railway Practice Are Embodied in the Design of This New Single-Deck Car of the Glasgow Corporation Tramways. At Right, Arrangement of Equipment on the Platform Follows the Usual American Practice

Features characteristic of American practices are found in the new car. General dimensions are as follows:

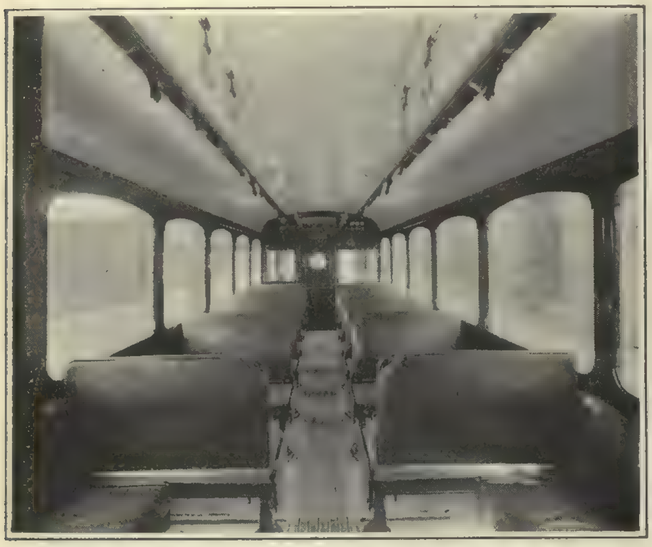
	Ft.	In.
Length over bumpers	32	6
Body length	22	6
Body width over all	7	2
Body width inside	6	10½
Body height inside	6	10½
Platform length	4	9
Bogie centers	13	0
Bogie wheelbase	5	4
Wheel diameter	2	2

The car is equipped with Brill 77-E trucks and four G.E. motors of 25 hp. each. It is anticipated that more rapid acceleration and greater speed will be obtained than in the case of the ordinary single-truck car.

Besides the usual hand brakes, the car is equipped with air brakes and one electro-magnetic brake. Power braking is rather a novelty for tram cars in Glasgow. Air brake equipment was supplied by the Westinghouse Brake & Saxby Signal Company, Ltd. In connection with the electro-magnetic brake, one pair of Metropolitan-Vickers 25-E magnets is fitted to each truck. There are four sand ejectors, two being operated by compressed air and two by pedal motion.

LUXURIOUSLY FINISHED INTERIORS ARE PROVIDED

Seats are provided for 36 passengers, of whom 24 are accommodated on cross-seats and the remainder on longitudinal seats at the ends. This arrangement allows standing room for about twelve passengers. In contrast to the bare wooden seats hitherto used, the new car has spring cushion seats upholstered in leather. The introduction of transverse seating is also new, as the longitudinal seat has hitherto been the rule in the lower saloon of double-deck cars, though cross-seats are employed on the upper decks.


Cross-Seats with Spring Cushions Upholstered in Leather Are an Innovation in the Design of Tram Cars in Glasgow

Platforms are provided with double exits, the passengers entering at the rear and leaving by the front, or *vice versa,* whichever system is found to be the more efficient. This feature should give a much higher average speed. It is one of the great drawbacks of the ordinary double-deck British car that the passengers have both to enter and leave at the rear, thus greatly increasing the duration of stops. All exits of the experimental car are equipped with doors and folding steps. It will thus be seen that the designed has uppermost in his mind making the new equipment generally adaptable.

EXPERIMENTS WITH OLDER EQUIPMENT

In connection with the other experiments, three standard double-deck cars have been slightly altered and equipped with different types of trucks and motors. Car No. 15 has had its underframe lengthened in order to accommodate a pair of Brill maximum traction trucks, type 39E. The driving wheels are of 26-in. and the pony wheels of 21-in. diameter. The motors are Metropolitan-Vickers No. 101-BR, of the lightweight, ventilated type. The trucks are equipped with electro-magnetic track brakes and there is also a complete air brake installation. The car seats 61 passengers, 38 on the upper deck and 23 on the lower. Longitudinal seats in the lower saloon have been removed and cross-seats substituted. The standard bodies are not wide enough to accommodate two passengers abreast on each side and the central aisle, so single seats are fitted on one side. There is, however, only one seat less than with the former arrangement. All seats are upholstered with air cushions.

Car No. 16 has been reconstructed and is now mounted on E.M.R. pivotal trucks. B.T.H. 502 motors and electro-magnetic track brakes are included in the equipment. The heating arrangement is similar to that of Car 15. Car No. 17 is being mounted on Brill 70E1 swing link trucks, with a wheelbase of 8 ft. and a wheel diameter of 26 in. Metropolitan-Vickers 101-BR motors are being fitted, as also are air brakes. Upholstered cross-seats are used on both decks.

One general disadvantage of the single-deck car, in the opinion of the Glasgow management, is that it has not sufficient seating capacity. The number of seats is little more than half that of the ordinary double-decker. It seems probable, therefore, that the ultimate decision of the Tramway Committee will be to utilize the double-deck rolling stock with larger motors and either with longer single trucks or with double trucks.

Duralumin Tokens Prove Popular

FOR a number of years the Union Street Railway, New Bedford, Mass., has sold 21 metal tickets for $1, the cash fare being 5 cents. At first paper tickets were used, but later, when Rooke automatic registers were introduced, these were replaced by metal tickets about the size of a 5-cent piece. In 1920 the unit of fare was set at 5 cents for a ride from either end of the city to the traffic center. There has been no fare increase since that date and metal tickets are still sold at the same rate. These metal tickets were replaced in 1922 by a light-weight, duralumin token. Front-page newspaper advertisements were used to promote the sale of tokens and in the spring of 1924 the company established selling agencies for these tickets at neighborhood drug stores. Previous to this, it was necessary for the purchaser to go to the ticket office in the center of the city. At no time have these reduced rate tickets been sold by the conductors on the cars.

Results attained under these various conditions are shown in the following table:

TOKEN USE ON UNION STREET RAILWAY

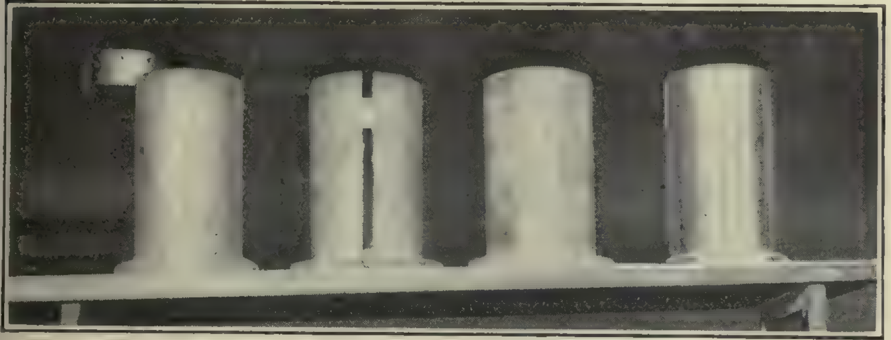
Years	Number of Metal Tickets Sold	Ratio of Metal Tickets to Gross Receipts, Per Cent	Per Cent Increase in Sale of Metal Tickets Since 1920
1920..............	538,382	1.89	.....
1921..............	670,087	2.56	24.4
1922..............	1,187,299	4.37	120.5
1923..............	1,774,425	6.41	229.5
1924..............	1,783,587	7.16	231.2
1925..............	1,835,627	7.37	241.1

While the gross receipts have slightly decreased since 1923, due to local mill depressions, the use of metal tickets has steadily increased, although the amount of saving made by metal ticket users was only 5 per cent Use of metal tickets as ready fares has speeded up fare collections and has supplied the company with advanced revenue prior to the time that the tickets are used as fares. The company believes, also, that one of the benefits of metal tickets is that a person in possession of these tickets, already paid for, will ride much more frequently than one who has to pay a cash fare.

Maintenance Notes

Undersize Armature Bearings Reclaimed

BY THE adoption of a method for building up the worn external surface of armature bearings the New York Railways has been able to reclaim practically all worn bearings and, as a result, effected a very appreciable saving in armature bearing maintenance.



New York Railways Rebuilds Its Worn Armature Bearings

Armature bearing on the left is one with a worn external surface. Next is a similar worn bearing which has been split, spread and is ready for welding. Next is a bearing which has had the split welded. At the right is a welded bearing which has been turned and is ready for rebabbitting.

Bearings which show abnormal wear on the outer surface or are undersize are split longitudinally and spread such an amount as will permit of obtaining the proper outside diameter. The spreading is done cold by means of hard wood or steel wedges.

The opening left in the bearings after spreading is electrically welded with a bronze rod of about the same chemical composition as the bearings. They are turned to the standard outside diameter and the inside rebabbitted. The larger internal diameter is compensated by a thicker babbitt wall for the bearing surface. By use of this plan of salvage for worn bearings at least double life has been obtained.

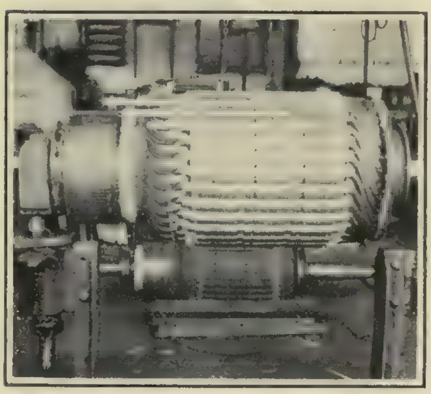
Reinforcing Trucks for Heavy Duty

DESIRING to prepare a number of motor cars for operation with trailers the Portland Railroad, Portland, Me., found it necessary to reinforce the old 27 E-1 trucks with which the cars were equipped so that they would stand up under the heavier duty. As indicated in the accompanying illustration, both trusses and gussets were used to aid in supporting the heavy 201-G motors. Two of these motors were mounted on each truck, each motor being rated at 5 hp. The trusses and gussets used were sufficient to strengthen the trucks for the heavier load.

Gussets and Trusses Were Used in Reinforcing These Trucks

Wood Strip Prevents Injury to Armature Coils

WHERE the insulation of armature coils is unprotected and exposed to foreign material after rewinding it is very often punctured or damaged in transportation or handling. To decrease this possibility the New York Railways is installing a hard wood strip on top of each coil under the banding wire. This strip has not only practically eliminated mechanical injury to the coils during handling, shipment and installation in field frames but it has served as a protective shield to the coils in case the armature revolved on the pole faces or a banding wire becomes loosened. On account of the protective features of these strips the armature maintenance costs have been materially reduced.



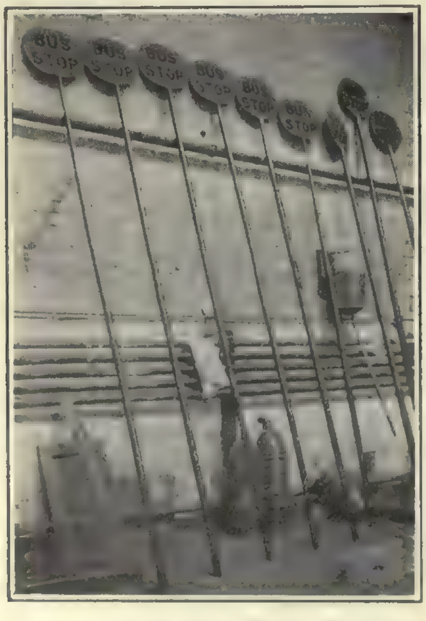
Hard Wood Strips in Place and Partly in Place on Top of Coil in Armature Core Slots

Bus Stop Signs from Trolley Poles

A PRACTICAL way of making use of old trolley poles has been hit upon by the Springfield Street Railway, Springfield, Mass. Needing a number of bus stop signs it was decided to trim several old poles to a

One of Springfield's New Bus Stop Signs

uniform length and then to weld oval sheets of metal to their upper extremities. Poles and signs were then given a coat of paint, after which the words "Bus Stop" were painted upon the metal background. The lettering is black upon a yellow background, thus making a striking appearance.



A Number of the Signs Which Were Made from Reclaimed Material

Dick Prescott Stops a Makeshift Job

And Embitters an Enemy

BY SOME of those peculiar combinations of chance which often bring about critical moments in men's lives, Dick Prescott, newly appointed assistant superintendent in the shops of the Consolidated Railway & Light Company, found himself frequently crossing the path of Pete Welcher, disaffected and envious shop inspector. Although Dick knew nothing of Pete's avowed determination to "show him up," there had on several occasions been something in the inspector's attitude and general demeanor that had raised a faint question in Dick's mind. He had, however, dismissed it without giving the subject much thought.

Pete was something of a mechanic. He loved to indulge a hobby of tinkering in the shop instead of attending to his work of checking up on repairs. Under the old shop management he had acquired some little reputation for inventiveness. This particularly pleased his vanity and gave him, he thought, a certain prestige in the eyes of the men. Though some of his products were crude substitutes for more efficient shop equipment sold by accredited manufacturers, they had been better than nothing and were used in various shop departments.

On one of his regular trips through the shop, Dick Prescott chanced to come on the inspector busily engaged in a corner of the machine shop.

"Hello, Pete," said Dick pleasantly, "what are you working on here?"

"Fixing up a commutator milling outfit," replied the inspector with an air of importance, pointing to an old lathe bed on which he had mounted some crude parts made in the blacksmith shop.

"Don't we have a commutator miller?" queried Dick, suddenly interested.

"Oh, yes, there's an old one in the armature room that I fixed up several years ago, but it ain't much good. This old lathe bed is just the thing we've needed right along."

"Well, if we need a new machine why don't we put in a requisition for one that's really designed for the job instead of wasting time and money trying to improvise one?" asked Dick.

"We're not wastin' money," exclaimed Steve sharply. "I can make one a whole lot cheaper than we can buy it and, besides, the only way we can get anything that we need around here is to make it."

"I can't quite see that," replied Dick. "In the first place you can't afford to be spending time away from your work doing this sort of thing. We're trying to get that pull-in record down, and the only way we're going to succeed is to have a check up on every job that goes through. It's far cheaper and better to buy a first-class machine than for you to putter around trying to make one. I'll see Bert Smith, the armature room foreman, and if we need a new miller, he can make out a requisition for one. The management understands that efficient tools are necessary to produce satisfactory work and keep down costs. You ought to be checking up on cars going through the shop instead of fooling with this."

Pete watched Dick as he walked toward the armature room. Then he slowly began to collect his tools, conscious that near-by workmen had overheard enough of the conversation to understand its import. With flushed face and averted eyes he finally left the machine shop, internally burning with rage and hatred.

New Equipment Available

Hall-Scott Motor Used in "a.c.f." Six-Cylinder Bus

MUCH wider springs than have heretofore been customary practice have been incorporated into the design of the "a.c.f." coach, which was recently announced by the American Car & Foundry Motors Company of New York. In addition to being wider the springs are built with a fewer number of leaves and are so designed as to be flat under load for the maximum of easy riding. This effect is heightened by the unusual length of the spring, the front spring being 49 in. x 4 in., and the rear spring 64 in. x 5 in. This extreme length gives a very slow period of vibration and the periods of the front and the rear are as far apart as possible, so that the vibrations of one set of springs will not build up in the other and cause a galloping effect.

Easy Riding Qualities of This Six-Cylinder "a.c.f." Bus Are Enhanced by Long Springs

Several models of the "a.c.f." coach are now on the market. Standard body designs are as follows: 29-passenger standard car type, 26-passenger parlor car, 29-passenger urban parlor car, 22-passenger intercity or sedan type and 56-passenger double-deck.

The bus is an entirely new one, although it has been developed along lines suggested by experience which the American Car & Foundry Motors Company's engineers have had in the manufacture of other buses, and after a careful study of bus operating requirements throughout the country. The general chassis dimensions are as follows: Wheelbase 230 in., over-all length 357 in., tread, front, 70⅝ in., rear, 78 in., over-all width 96 in. The frame is of heat treated pressed steel, fish belly type, with a maximum depth of 11 in., tapering to 6 in. at the front and rear. It is stepped up over the front axle and arched over the rear axle, and has a 3-in. flange through the entire length.

The power plant is the standard six-cylinder Hall-Scott engine, with 4½-in. bore and 5-in. stroke. This engine is capable of developing more than 90 b.hp. at a governed speed of 1,750 r.p.m. The lubricating system of the engine is provided with a filter and a means of removing the condensed moisture and fuel dilution so that the crankcase oil does not need to be changed until it begins to break down.

Particular care was exercised in the design of the axles. The front axle is a special "a.c.f." Timken design, reinforced to withstand the strain imposed by the front wheel brakes. It is of the I-beam drop center type, with straight thrust roller bearings in the steering spindles and opposed Timken tapering roller bearings in the wheel hubs. The springs are carried on top of the I-beam.

The rear axle was built by Timken Roller Bearing Company on a design which was developed by the American Car & Foundry engineers. It is of the underslung worm type with the worm mounted between Timken tapered roller bearings, with a Hyatt roller bearing on the shaft. The springs are mounted beneath the rear axle.

Westinghouse steel shoe air brakes are standard equipment on all models. On the single-deck model these operate on the rear wheels only, with 16½-in. x 6-in. hardened steel drums. On the double-deck and gas-electric models Westinghouse air brakes are also provided on the front wheels, working in conjunction with the rear wheel brakes. The single-deck mechanically driven models are equipped with emergency brakes on the front wheels, these being of the Bendix three-shoe type operating in 16½-in. x 3-in. drums.

With the exception of the axle, the chassis is lubricated by the one-shot system with feed lines to all main lubricating points on the engine, clutch, drive line, spring ends and brake mechanism located on the frame. Lubricating points on the axles are equipped for the Zerk high pressure system.

Body framing consists of selected straight grain hard wood paneled with Plymetl. Upholstery is in genuine leather, the woodwork is mahogany, the trimmings nickel, and the exterior finish is Pyroxalin enamel. All models are lighted by means of a 12-volt electrical system, employing two three-cell batteries. Standard equipment includes ventilators and heaters, illuminated destination signs, bumpers, buzzer systems and emergency stop signals.

Low Pressure Tires Are Standard on White Six-Cylinder Bus

SAID to be the first bus to be designed completely from the ground up for the application of ballon tires and four-wheel metal-to-metal air brakes, the six-cylinder model 54 chassis has been placed on the market by the White Company. The chassis is intended for 18 to 29-passenger bodies and deliveries will start early in April, it is expected. From now on the company will manufacture a line of four and six-cylinder chassis to meet all types of service demands.

As in the case of the other White bus models, the new six-cylinder unit is being built only as a single-deck bus.

The engine delivers 100 hp. at 1,900 r.p.m. The length over the various bodies, including bumpers, is just under 28 ft., the maximum allowed in several states. The width can be kept

This White Six Cylinder Model Was First Exhibited at the Cleveland Convention

down within the 84-in. limit several of the southern states require, provided high pressure tires are used.

Efficiency and operating requirements have both been considered in working out the engine design. It is of 4⅝-in. bore and 5¾-in. stroke, giving a total displacement of 519 cu.in. Cylinders are cast in a single block to get rigidity and quietness of operation. Two spark plugs are used in each cylinder. Valve construction is of the overhead type, the valves being operated by push rods from the camshaft along the right-hand side. It is, therefore, possible to remove the head and grind the valves without retiming.

A Stewart-Warner vacuum tank of large capacity is used to supply fuel and no difficulty is experienced in obtaining fuel even when operating over the steepest grades.

The exhaust valves of the engine are of the internally cooled type, the hollow stem being filled with a potassium nitrate which carries the heat from the head of the stem and guide. An ejector type exhaust manifold is used and has resulted in a decided increase in engine power. In this the passages from each cylinder head are arranged so that exhaust rushing from one cylinder helps that from the next. Cooling is by a centrifugal pump, with temperature control by thermostat placed in the water outlet between the engine and radiator. This consists of a cast aluminum shell with removable core.

Standardization on balloon tires for the model 54 has led to a slightly narrower frame, of high carbon steel, heat treated. The 46-gal. fuel tank is mounted in a cradle which is bolted to the outriggers so that the tank can be dropped down without disturbing the body. Another feature of help to the body builder is the location of clutch pedal and steering gear; both are outside the left-hand frame rail.

The clutch is of the two-plate dry disk type, air cooled, the central member having impellers which give a positive circulation. From the clutch and four-speed transmission the drive is through a tubular shaft with three universal joints and S.K.F. center bearing to a spiral bevel rear axle. Normally this has a 4.5 to 1 reduction, although other ratios can be supplied to meet operating conditions. Transmission ratios are direct on high; 1.65 to 1 on third; 2.7 to 1 on second, and 5 to 1 on first, with a reverse ratio of 6.35 to 1.

Westinghouse air brakes of the metal-to-metal type are standard equipment and the chassis has been designed with their application in mind. The drums are high carbon steel and shoes of low carbon steel, the latter being of the one-piece type so that they can be thrown away when worn out. In addition to the automatic equalization of the air brakes, a slack adjustment is provided between the brake diaphragm and the cam. The compressor, which is of 6 cu.ft. per minute capacity, is directly lubricated from the engine and driven directly from the crankshaft.

The compact instrument board which was first developed for the model 53 bus chassis is a feature of the new unit. An air pressure gage for the brakes is included on the model 54 board. On the board are the electrical indicating instruments for the two unit systems, consisting of a Leece-Neville 12-volt starting and lighting equipment with voltage regulator. The generator is rated at 30-amp. and the battery at 112 amp.-hr. at the 20-amp. rate.

Due to the use of low pressure tires as standard equipment a semi-center-point steering with inverted Ellicott type front axle has been adopted. The steering gear is of the Ross cam and lever type with a 16 to 1 reduction at the middle point. A device to prevent undue flexure or vibration at high speeds has been mounted on each end of both front springs. Front springs are 48 in. x 3 in., and the rear springs 64 in. x 4 in., the latter being of the two-stage type.

Mack "6" Has Made Its Debut

MANY of the practices followed in the standard model AB Mack bus have been repeated in the new six-cylinder model AL unit, but it has been necessary to effect certain departures to allow for the additional power output of the six-cylinder engine. Among the mechanical features which come under this category are the engine, a single plate clutch and the relocation of the transmission to a point amidships, thereby effecting a better disposition of the weight and increasing the accessibility of both transmission and clutch.

In outward appearance the new model resembles the company's other parlor car type bus until the hood is reached. Here the physical aspect has been changed somewhat by a new windshield known as the "clear-vision" type and a new radiator. This latter unit, having individual fins and tubes, is built up from four castings; the top tank, the

Principles of Shock Insulation Have Been Further Applied in This Mack Six-Cylinder Bus bottom tank and two side plates. Over these is placed the radiator shell of sheet metal.

The AL is being built in two models, the 29-passenger parlor car and the 29-passenger city type bus, the latter being also obtainable with gas-electric drive, the same as in the AB city type buses. The only dimensional difference between the parlor and city type models is an additional eight inches on the over-all length of the parlor car, making it 341 in.

The six-cylinder engine has a 4½-in. bore and a 5-in. stroke, which is identical with that of the AB model engine. It is rated at 97 hp. at 2,200 r.p.m. The cylinders are cast en bloc with the removable heads cast in pairs, insuring against distortion on the cylinder head. The pistons are of magnesium aluminum alloy of the constant clearance type, with wrist pins clamped in the connection rod and free to rock in bronze bushed piston bosses. Four main bearings having a diameter of 3½ in. are employed. Forced feed and splash lubrication is employed as in other Mack engines and a special oil filter is provided in connection therewith.

A single plate clutch has been used to obtain greater simplicity and to eliminate clutch rattle, a frequent fault with multiple disk clutches in heavy duty service. A cushioning effect between transmission and clutch is secured by a device known as a torque insulator. The purpose of this unit, which is made up of four rubber blocks, is partly to absorb the initial starting torque and reduce the resultant strain on the drive line.

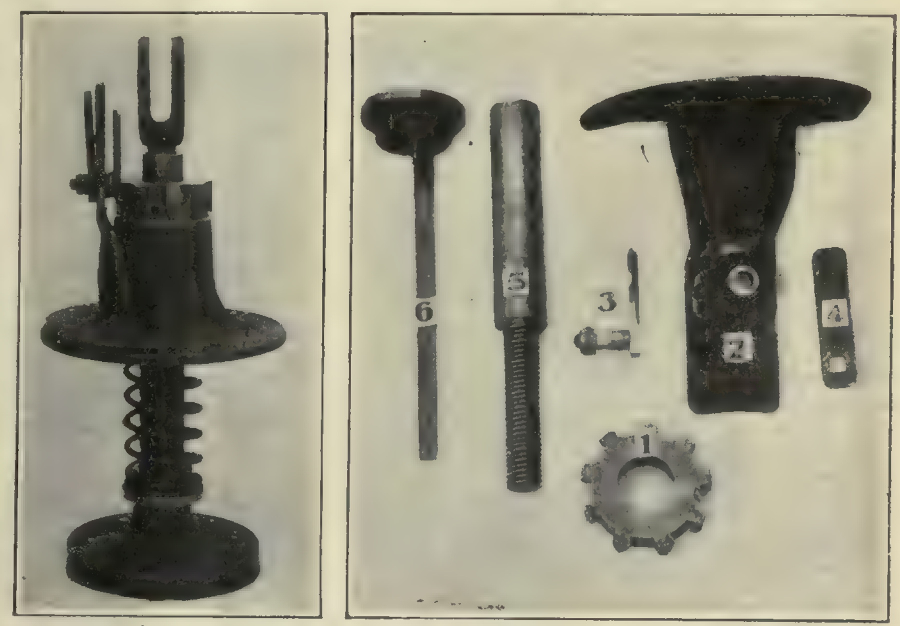
It has for some time been standard Mack practice to use blocks of live rubber for insulating the various units from the frame. This method of mounting springs, radiator and steering column has been elaborated somewhat in the AL model so that the engine, transmission and gasoline tank are now also thus mounted. This practice of rubber mounting, or "shock insulating" as it is termed, is said to result in a vehicle which is remarkably free from road shocks, vibration and noises incident to propulsion.

The transmission, especially developed for this chassis, affords four speeds forward and the ratios are proportioned to harmonize with the characteristics of the engine on the one hand and those of the chassis on the other. The conventional three-rod arrangement ordinarily employed with admiship gear boxes is dispensed with in favor of a single control rod. The reverse latch is released by depressing the control rod, no catches or buttons being used. The location of the transmission necessitates the use of one more universal joint than is employed in the AB model, consequently the drive line is equipped with five Spicer universals of the 500 series. Ball bearings are used throughout.

Springs are semi-elliptic throughout with 36¼-in. x 2-in. auxiliary springs fitted to the rear springs to allow for variable loads. The frame is of pressed chrome-nickel steel, heat treated. The gasoline tank is mounted longitudinally along the left-hand side and has a capacity of 50 gal. Tires are 34 x 7 in. with duals on the rear wheels.

Slack Adjuster Attached to Brake Cylinder

FOLLOWING a successful test extending over several months on a car of the Scioto Valley Traction Company, Columbus, Ohio, a type of brake slack adjuster invented by W. S. De Camp will be manufactured by the Deschler Machine Works, Chillicothe, Ohio. This slack adjuster is intended for fitting to the brake cylinder on the non-pressure head. Movement of the piston beyond a predetermined travel produces a turning movement through a ratchet and pawl to take up slack in the brake rigging.



At Left, Automatic Brake Slack Adjuster Assembled on Non-Pressure Head of Brake Cylinder. At Right, Detailed Parts—(1) Ratchet, (2) Supporting Bracket, (3) Pawl, (4) Weight Lever, (5) Screw Piston, (6) Washer with Key

Accompanying illustrations show the slack adjuster attached to the non-pressure head of the brake cylinder and also details of the various parts. In the details part No. 1 is a ratchet which is attached to the end of a hollow piston. The pawl for engaging this ratchet is supported by a bracket bolted to the non- pressure head of the brake cylinder. This is shown as No. 2 in the detailed parts. The pawl which engages the ratchet is No. 3, and in order to insure that the pawl will drop whenever the ratchet goes beyond it in application position a weight lever, No. 4, is provided. In release position the pawl engages the ratchet and turns the piston in the cylinder $\frac{1}{16}$ in., which makes the push rod $\frac{1}{16}$ in. longer.

A screw piston with an oblong hole for application to an oblong push rod is shown as detail No. 5. The push rod slides in this whenever the hand brakes are applied. The oblong portion fitting into an oblong hole holds the screw piston while the piston in the cylinder is turning $\frac{1}{16}$ in. in release position. A nut is bolted into the hollow piston to hold it when it is turned by the piston in the cylinder. The screw piston has two double threads to an inch. A washer with a key is shown as detail No. 6. This washer and key boxes the release spring and keeps it from turning the piston back in the cylinder. The washer fits over the hollow piston and the key slides in a bushing in the non-pressure head. If the release spring bore firmly against the non-pressure head the desired turning would not result, but with the spring against the washer the necessary turning movement is provided.

Association News & Discussions

More Detailed Annual Reports Urged

PUBLICATION of more information upon property valuation, details of mortgages and franchises, etc., by utility companies and especially by holding companies in the utility field to secure a broader public market for their securities, is urged in the last report of the Public Service Securities Committee of the Investment Bankers Association of America. This report was presented at the annual convention of the association, held in Quebec, Oct. 11-15. The annual reports of some of the leading utilities are models, says the committee, and while lacking in some of the statistical operating figures which feature the railroad reports and while not yet standardized, they nevertheless give an excellent statement of the company's affairs in a form well suited for the general public. With the broadening market for utility securities, however, the report points out, there will arise, particularly from savings banks and other institutions accustomed to give closer and more detailed scrutiny to the selection of their investments than the average individual, an increasing demand for data on these securities.

In the present policy of the formation of large operating utility systems, based on geographic lines, the committee sees a condition corresponding to that of the formation of our large railroad systems many years ago. The continual increase in the distance over which electricity can be transmitted economically has made such grouping not only possible but profitable, and in such a period the public utility industry and its bankers are urged to avoid many of the mistakes made in the railroad history. The reward, in the opinion of the committee, will surely be sufficient if the utilities can avoid the burden of public antagonism under which the railroads have labored so long.

The committee sees in the plans of the state of Oregon to construct, acquire and operate a state-wide electric generation, transmission and distribution system a proposal contrary to the soundest economic and governmental principles. It will put the public utility business under the management of five board members, subject to political election and without the necessity of having any experience or qualification for running such a business enterprise and with a pledge of the credit of the state for all examinations.

The committee sees in the passage of laws by the states of Massachusetts, Connecticut and New Jersey admitting public utility bonds conforming to certain specified requirements as legal investments for savings banks a step of very considerable importance to the industry. Such legislation, it says, affords the banks a proper and wider field of selection for their investments and makes available to a sound and essential industry large additional amounts of private capital. The committee points out, however, the practical difficulty of establishing any set rule by which to measure the safety or desirability of an investment security for any class of investors and urges that the restrictions be made not too narrow, but that the fullest extent possible be given to the institutions for the exercise of their own discretion and judgment. The committee declares the plan of the National Association of Railroad and Utilities Commissioners to secure the adoption of uniform state regulatory laws is desirable.

West Virginians Hold Convention

J. D. WHITTEMORE, vice-president and general manager Monongahela West Penn Public Service Company, Fairmont, was elected president of the Public Utilities Association of West Virginia, which held its ninth annual convention at Charleston last week. Others elected as officers were: A. M. Hill, Charleston; C. S. Dawson, Charleston, and A. C. Spurr, Wheeling, vice-presidents; A. Bliss McCrum, Charleston, secretary; G. B. Moir, Charleston, treasurer, and J. W. Cummings, Charleston, assistant treasurer.

Instructive as well as educational addresses were presented at the closing session. Chief among the talks was that given by N. M. Argabrite of New York, vice-president of the Appalachian Electric Company.

Addresses given included the annual talk by the president, W. R. Power of Huntington; Helen E. Steiner of Cleveland, chairman of the women's committee of the east central division, National Electric Light Association; George M. Chute, Jr., of Schenectady, N. Y.; A. M. Hill, vice-president and general manager of the Charleston Interurban Railroad and chairman of the bus division of the A.A.A., whose subject was "Transportation a Science"; D. L. Gaskill, Greenville, Ohio, secretary of the east central division of the National Electric Light Association, who spoke on "Public Relations, a Liability or an Asset," and former Governor E. F. Morgan, whose subject was "Citizenship."

At the annual banquet former Gov. W. A. MacCorkle was toastmaster and H. B. Flowers, president of the New Orleans Public Service, Inc., was the chief speaker.

"Advertising has been distinctly educational to the utilities as well as to their customers," delegates to the convention were told by Thomas D. Mays, president of the Mays-Williams Company, Inc., Charleston advertising agency.

A. M. Hill of Charleston spoke as follows, in part:

> We are living today in a great transportation era, particularly in our own great country where our people seem to have an insatiable desire to be always going somewhere or returning and in a considerable hurry at that. The public wants frequent, complete, safe, comfortable and fast means of travel, and if it gets what it wants it will pay the price.
>
> The story of the comeback staged by the electric railways is one in which fortitude, brains and nerve predominate, with fair-minded, open-handed salesmanship always in the foreground. A type of leadership was developed which tackled the problems confronting the industry according to new conceptions. They sold themselves on their jobs, then sold their employees, and finally went right to the people with their story, and sold them too.
>
> These men did not set their jaws and relentlessly fight the compelling advance of the motor bus. They were quick to recognize it as an ally if operated by them and a dangerous menace otherwise. Many companies have paid dearly for their early antagonism to the bus, but, I am glad to say, practically all of these have seen the error of their way and are turning their enemies into allies.
>
> While the condition of the railways is improved, there is still much room for further improvement. Although operating economies have been introduced, there is the possibility of greater economy. Better employee co-operation and understanding have been brought about. We must continue to advertise frankly our story to the public. Above all else, we must constantly strive for better service to the public.

COMING MEETINGS
OF
Electric Railway and Allied Associations

Oct. 25-29—**Annual Congress and Exhibit, National Safety Council, Book-Cadillac Hotel, Detroit, Mich.**

October 28—**New England Street Railway Club, regular meeting, Copley Plaza Hotel, Boston, Mass., 3:30 p.m.**

Nov. 5—**American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p. m.**

Nov. 16-18—**Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.**

Nov. 17-18—**Iowa Electric Railway Association, operating and maintenance section, annual convention, Fontanelle Hotel, Omaha, Neb.**

New England Street Railway Club to Meet October 28

ELECTRIC welding as used in the Springfield and Worcester car shops will be discussed by W. L. Harwood, superintendent of equipment of these companies, at the next regular meeting of the New England Street Railway Club, Oct. 28. The afternoon session will convene at 3:30 p.m. at the Copley Plaza Hotel.

The News of the Industry

Chicago Council Acts

Committee Orders Ordinance Framed to Embody Features Proposed by Eastern Bankers—Local Traction Man Attacks Plan

Before Nov. 1 Chicago will have a new traction ordinance presented for its approval which embraces the plan affecting the city's street car system brought forward by F. J. Lisman, New York, and associates.

The City Council committee on local transportation on Oct. 15 voted its approval of the Lisman plan after many days of dramatic debate and ordered Corporation Counsel Francis X. Busch to start preparing the ordinance immediately. Up to this time conferences between the city and the New York bankers have been based on a skeleton draft of their proposal. When the new ordinance is completed it will be sent back to the main committee of the City Council without discussion.

Prior to the acceptance of the principal points of the Lisman plan by the sub-committee, Major R. F. Kelker, Jr., city engineer, presented an analysis showing that without an increase in fares it would be possible to amortize in 30 years the $140,000,000 of first mortgage bonds proposed to be issued under the plan.

The enforced absence of several of the bankers and Surface Lines executives who are represented in the negotiations caused the postponement of the last scheduled conference of the Aldermen, the Surface Lines executives and local bankers. A report on the financial features upon which the new ordinance is to be based was to have been heard.

Perhaps the most pointed criticism against the Lisman plan was made by Leonard A. Busby, president of the Chicago City Railway, in a signed article recently appearing in the Chicago *Herald and Examiner*. Mr. Busby said in part:

> The plan is expressly conditioned upon its acceptance by the present security holders. Unless they voluntarily accept the proposition, the plan fails. Yet the plan offers to the present first mortgage bondholders only 5 per cent interest, while the new money is to get 5½ per cent and be underwritten at 91.
>
> Taking the bond interest into account, the proposition means that the car riders will pay on an average more than 6 per cent for the new money—an additional burden of $500,000 for twenty years, as against financing on a plan whereby the money could be procured on a 5 per cent basis. The junior security holders are offered an average return of 3.6 per cent during the first five years, compared with the 5 per cent they are now receiving and a 5 per cent return thereafter.
>
> The total amount to be paid the promoters under the Lisman plan is $82,040,000, or an average of $2,734,600 a year for 30 years. This will, of course, have to be paid by the car riders in addition to the $7,500,000 a year required for sinking fund purposes in order to turn the property over to the city at the end of 30 years for $1.

As Mr. Busby sees the Lisman plan, under it "the 20-year franchise is a bait to get control, if possible, of a sound business enterprise on a basis very profitable to the promoters."

Further Data on St. Louis Transit Needs Revealed

Rapid transit needs of St. Louis, Mo., require an immediate expenditure of $40,000,000 for the installation of five downtown subways, the erection of a three-story river-front structure to serve as a subway loop, storage grounds for street cars and a riverside driveway for automobiles, according to the final section of a report by C. E. Smith, consulting engineer for the city, and a special committee of the Board of Aldermen.

The second step in the development of rapid transit anticipates the extension of six radial subways from the downtown section half way to the city limits. The last step would carry the tubes or L lines to the city limits, or a total of 28 miles of rapid transit lines. Mr. Smith estimates that the complete rapid transit system can be built for $100,000,000.

Three ways of financing the subways and other rapid transit improvements were suggested.

Pending construction of the subways the committee recommends that service be speeded up by the installation of express service by street car and local service by bus.

On the subject of buses the committee specifically criticised the unregulated operation of buses in St. Louis and deplored the hardship this works upon the street railway.

The committee also reported in favor of neutral zones for street cars on wide boulevards. It advised consideration of the skip-stop plan in vogue during the war period.

Service to Argentine, Kan., Restored

Railway service over the Twelfth Street bridge into the Argentine district of Kansas City, Kan., was resumed on Oct. 14 by the Kansas City Public Service Company, pursuant to an order of Judge Kimbrough Stone in the federal court. The service was discontinued two years ago.

The line will be known as the Argentine-Twelfth Street line. The route is the same as that of the old Argentine line. Five-minute service is being given, beginning at 5:30 o'clock a.m.

Action of the new owners of the railway in restoring this service brought much favorable comment from the newspapers and citizens of the Argentine district and from the city commissioners of Kansas City, Kan.

Boston "L" Insistent

Trustees Want New Subway Finance Plan — Company Unwilling to Operate Extensions if Fares Must Be Increased

Correspondence between the Mayor of Boston and the board of trustees of the Boston Elevated Railway, Boston, Mass., makes it appear that the city has reached its limit in subway and tunnel extensions under the plan of financing followed up to this point. If the position prevails which the trustees have taken in this new controversy the Elevated will not obligate itself to support alone the financing of any future extensions. The trustees suggest a plan to divide the burden among the taxpayers, real estate owners and car riders.

The issue between Mayor Nichols and the trustees was brought to a head over the continued failure of the Elevated to sign a lease for the use of a proposed subway under Governor Square, where traffic congestion has become very serious. The Elevated took the view that the congestion is caused by automobiles and that the cost of the remedy should not be placed upon those who ride in the Elevated cars; further, that the Elevated can no longer finance such extensions without increasing the car fares.

CONCLUSIVE ANSWER CONTAINED IN COMPANY STATISTICS

Former Congressman Samuel L. Powers, chairman of the Elevated trustees, concluded a letter dated Oct. 14 to Mayor Nichols as follows:

> In your letter you use the following language:
>
> "Let me ask you a blunt question. Is it because your company is unwilling to undertake any further rapid transit extensions until the settlement of public control by the Legislature?"
>
> I cannot but feel that the statistics I have given are a conclusive answer to your question. The question of extension of public control has nothing whatever to do with the attitude of the trustees relative to subway extensions.
>
> We fully appreciate the effort you are making to improve transportation facilities in Metropolitan Boston, and it is the desire of the trustees to co-operate with you as as far as they can consistent with their official duty as they see it. No one doubts that the extension of subways in certain localities would go a long way toward improving rapid transit facilities, and, as you say, such facilities are vital to the welfare of this community, but it is entirely evident that the extensions contemplated by you and by the Planning Board cannot be made as called for, at the exnense of that part of our people who travel in elevated cars.
>
> It is self-evident that subway construction already completed has added millions upon millions to the value of real estate in Boston—undoubtedly more than the amount that the subways have cost. It is apparent that the increase of vehicular use of the streets calls for the expenditure of further millions, but it is equally apparent that until there has been adopted a different method of meeting the cost of construction of subways, either through general taxation or by the assessment of betterments upon those directly benefited, there can be no substantial advance in subway extension.

H. P. Savage Elected American Legion Commander

National commandership of the American Legion was conferred upon Howard P. Savage, superintendent of maintenance of way of the Chicago Rapid Transit Company, at the annual convention of that organization held in Philadelphia on Oct. 15. The election of Mr. Savage was made on the twenty-first ballot after the stiffest fight in the history of the Legion.

"High Power" Savage, as he is affectionately known to his fellows on the "L," was the first commander of the Chicago Elevated Post of the Legion. He is a past state commander of Illinois. Conspicuous among his achievements in Legion affairs have been his activities in securing the soldiers' bonus, his work in increasing Legion membership and his plans for a sound financial status of all posts.

He entered the service of the Metropolitan West Side Elevated Railroad, now part of the Chicago Rapid Transit system, as a track foreman. He was shortly promoted to track engineer, and later to his present position of general superintendent of maintenance of way of the elevated railroads.

During the war Mr. Savage served overseas as lieutenant in the 55th Engineers. On his return to Chicago he organized Chicago Elevated Post No. 184 of the American Legion.

When he stepped from the train in Chicago on his return from the Philadelphia convention, he was greeted by one of the largest crowds ever gathered in the vast Union station. Bernard J. Fallon, vice-president of the Chicago Rapid Transit Company and official spokesman of the occasion, proclaimed Savage a "credit to Chicago and a credit to the nation, the type of man Chicago needs."

Indianapolis Inciter Sentenced

Harry Boggs, former president of the Indianapolis union, who pleaded guilty some time ago to a charge of contempt of federal court in connection with the recent strike of trainmen of the Indianapolis Street Railway, has been sentenced to serve 120 days in jail by Judge Robert C. Baltzell in United States court.

During the testimony it was disclosed that Boggs had been in the employ of the Indianapolis Street Railway up to the time he fled the city. The contempt charge against Boggs was based on information by the district attorney in which it was alleged that Boggs had incited acts of violence among the strikers in violation of Judge Baltzell's injunction. Boggs fled from the city at the time federal authorities began an investigation of the strike. He has been in jail 44 days pending disposition of his case.

Boggs said that officers of the railway did not know that he advised striking employees to "cut loose" with acts of violence to impede operation of cars.

"I'll say frankly," interrupted Judge Baltzell, "I don't like the looks of things. I want the government to look into this."

"Are you trying to shield the railway?" inquired the judge of Boggs.

"No, sir," said Boggs.

"Why don't you tell the truth?" asked the court.

"I didn't want to tell the court I was playing both sides."

"You double-crossed them both, didn't you?"

"No, sir, I didn't double-cross the car company."

"Didn't you double-cross the company when you told the strikers there were too many cars running?"

Boggs did not answer.

"This man looks like a pretty dangerous citizen," said the judge.

Boggs denied that Robert P. Armstrong and John M. Parker, vice-presidents of the national organization and organizers in Indianapolis, had any knowledge that he was on the payroll of the company. He said they wished him to take charge of the strike.

He said that he was employed by the railway to bring about an amicable settlement if possible and to try to keep the men from damaging cars. He told the court on one occasion he called the police and told them of a conversation he heard in which it was planned to dynamite a car in the downtown district. The court said there was no doubt in his mind that Boggs's acts largely were responsible for the violence committed by strikers.

Judge Robert C. Baltzell of the federal court ordered a further investigation when he sentenced Boggs for contempt of court.

Electricity for Reading Suburban Lines

A survey of the system of the Reading Company, Philadelphia, to determine the feasibility of electrifying its suburban lines is now in progress. Charles H. Ewing, vice-president, in charge of operations, so announced on Oct. 21. He said a report from the engineers was expected within three months, but that then and only then could definite announcement be made of the plans for starting the work.

The same day E. B. Temple, assistant chief engineer of the Pennsylvania Railroad, declared that electrification of that road's line from Philadelphia to West Chester would be completed early in 1928.

Utility Speakers to Inform Students

Ohio students will learn the elements of economic life through public utility speakers. To this end Vernon M. Riegel, state superintendent of public instruction, has sent a letter urging all superintendents of schools to arrange for public utility speakers to address student bodies. He said it is always helpful to be able to give students in the latter years of school authoritative information about forces and factors which affect economic life. He feels the public utilities can furnish the information needed to dispel the general ignorance about the structure under which modern industrial society functions.

Service Restored in Pensacola

The railway lines of the Pensacola Electric Company, Pensacola, Fla., were forced to suspend while the storm raged on Sunday night, and there was a hurried order to return the cars to the carhouse. Practically all had been housed before the power plant went out of commission, and since the night of Sept. 19, or the early morning of Sept. 20, Pensacola has been without railway transportation. On Oct. 3 the statement was made that it probably would be a week or ten days before service could be restored.

Service on the line of the Miami Beach Railway, operating between Coral Gables and Miami, Fla., was restored on Oct. 3. All poles, wires and power facilities have been replaced, but several of the cars were damaged by water. Two cars are being operated every half hour between Ponce de Leon Boulevard at Coral Way and South Miami Avenue at First Street.

Mr. Mitten on Industrial Peace

Thomas E. Mitten, chairman of the Philadelphia Rapid Transit Company, Philadelphia, told the Congress of American Industry, in session recently, that "humanizing the capitalistic system has been fully accomplished, so far as the P.R.T. is concerned, the basis of its success having been built on a foundation of trust and confidence." Mr. Mitten was responding to the request of the congress that he show in what way the plan of industrial peace in use in Philadelphia had contributed to the industrial success of the nation. The points he covered were the conception of the plan, what it had done, why it had succeeded and what it could be made to accomplish. In concluding his remarks Mr. Mitten said in part:

> America's best way to overcome industrial autocracy is to harness labor and capital into an industrial democracy for greater production, with proper distribution of the resultant profits, since labor, capital and consumer are all benefited through added production, which makes for lessened cost of living. When a physical merger of capital and labor is thus effected, so that they have only one interest instead of two, then only will they pull together. There can be no strikes then, because a man does not destroy his own.
>
> America endeavored in Kansas to, by law, require arbitration of disputes between capital and labor, but failed in the attempt. Harmony of these interests cannot be enforced by law, nor can co-operation be secured by coercion. Recent labor legislation can produce only temporary peace with the railroads, which, however, cannot last longer than the time required to increase wages beyond the power of the industry to pay. Capital must encourage labor to produce by permitting its participation in the resultant profits. Labor must produce more to get more and in so doing should get its fair share of the profits.
>
> If the employees in the anthracite fields were offered an increase of wages in proportion to their future increased production, it is reasonably certain that a sufficient increase would be forthcoming, to compensate labor, capital, management and consumer. Even if this increase should justify only 10 per cent a year and this amount be invested in securities representing ownership, the men would in ten years control the mines.
>
> A similar condition could be brought about in the bituminous coal industry in fifteen years, and it is safe to say that if the employee-ownership principle were applied to all industry, America would within one generation become a strike-proof nation, its democracy would be industrial as well as political, and the capitalistic system would not only have been humanized, but would have reached its maximum of usefulness in the advancement of human progress and civilization.

Franchise Accepted in Louisville

Railway Agrees to Seven-Cent Fare with Transfer Privilege—Submits to Supervision of Board of Public Works—Initial Valuation Expense to Be Met by Company

THE Louisville Railway, Louisville, Ky., has formally accepted the provisions of the new franchise ordinance which was put through the City Council and signed by Mayor Will. Accepting the provisions of the ordinance was merely a formality as the company made a long struggle to get the ordinance through, agreeing to the few changes made just before its passage. The ordinance adopts general principles of regulation, fixes rates of fare and imposes certain duties upon the Board of Public Works.

Section 1 stipulates that the fare is to be continued at the present rate, namely, 7 cents for single-trip cash fare with general transfer privileges for two years or until appraisers report to the Board of Public Works and the Board of Public Works reports its findings to the General Council.

SCHOOL CHILDREN TO RIDE AT HALF FARE

The company is ordered to establish a general transfer system under which the combined rides by street car and automotive units shall not exceed in price the fare charged for a ride upon automotive vehicles alone, and shall also afford transportation to school children at half fare, and to policemen, firemen and park guards, when in uniform, free, provided the fare charged for a ride upon automotive vehicle shall not exceed 10 cents during the two-year period.

The Mayor, with the approval of the General Council, will appoint a qualified appraiser whose duty it will be to value the property of the Louisville Railway. In addition an independent certified accountant will be employed to make a separate report. After the Board of Public Works has reviewed the valuation, the General Council will determine the value of the property used and useful by it in the public service and determine a rate of fare which will enable the company to earn a fair return on its property, this fare to be subject to readjustment from time to time.

The expense incurred by the city in making the initial valuation will be paid by the Louisville Railway, provided, however, that the company shall not be obligated to expend more than $50,000, which sum shall be charged to operating expenses.

In the exercise of its power to fix just and reasonable rates the General Council shall, after the report of the appraisers, modify, establish, adjust or approve rates so that the railway will, under economical management, earn an aggregate annual net operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property. The General Council from time to time will determine what percentage of such aggregate property value constitutes a fair return. In making such determination, it will give due consideration, among other things, to the transportation needs of the city and the necessity of enlarging such facilities in order to provide the people of the community with adequate transportation.

Changes in rates initiated by the General Council will be made after reasonable notice to the company. The Board of Public Works will compile and keep all information up to date in respect to the value of the company's property and will report the findings to the Council for its full information and advice in fixing rates.

Should the company desire a change in rate it may file the proposed change with the General Council for its consideration and at the same time file a copy of the proposed change with the Board of Public Works. If within 60 days the petition has not been acted upon by the General Council the changes proposed shall take effect, but the Council shall have the right by resolution duly passed within such 60 days period to extend the time for any period fixed by it not exceeding 90 days. The General Council must neither disapprove nor modify the proposal of the company without according the company a full and fair hearing.

The company will report monthly to the Board of Public Works and on April 1 of every year file with the Board of Public Works and with the General Council a statement of the investment, revenues and expenses for the preceding calendar year.

The Board of Public Works will supervise the management of the railway. To enable it to do this, auditors, accountants and inspectors are to be employed as the General Council may, by ordinance, from time to time authorize. In order to defray the expenses of such supervision, the Louisville Railway, in lieu of any payments now provided for, will pay annually to the city of Louisville the sum of $10,000.

Section 9 states that the Board of Public Works shall have access to all books, records, correspondence, files, data and all other recorded information of any kind or character kept by the railway. The accounts are to be kept according to the rules promulgated by the Interstate Commerce Commission.

COMPANY TO PRESCRIBE RATE OF DEPRECIATION

Section 10 states that the company shall, as an expense of operation, accrue adequate sums for depreciation and amortization and set up the same in the form of reserves. Subject to revision by the Council, it will have power to prescribe the annual rate of depreciation and the class or property to which it shall be applied, but until the valuation shall have been made the gross sum for depreciation will be $175,000 a year unless the Board of Public Works shall assent to a greater sum. Property becoming obsolete, worn out in service or abandoned is to be amortized over a period of fifteen years, unless some other period is agreed upon by the Board of Public Works and the company.

The company will issue no new bonds or other securities representative of funded debt without the assent of the Board of Public Works as to amount, interest rate, maturity and sinking fund provisions.

To obtain new money for improvements, extensions or for betterments the company may from time to time issue and sell new securities in such amounts as may be necessary under certain conditions provided. New money for such purposes shall be obtained by the company at as low a rate as practicable, and should the price of such new money as secured be unreasonably high, then and in that event the return upon the property represented by the new money shall be allowed only at a reasonable rate without respect of the actual cost of such money to the company.

The new ordinance states that the surrender by the company of any and all franchise terms in excess of the present constitutional limit of twenty years from Aug. 25, 1922, by its formal acceptance of Ordinance No. 330 is confirmed and all franchise operating rights that the company may own, have or possess extending beyond Aug. 25, 1922, are included in said surrender and any and all its franchise rights shall expire and determine twenty years from Aug. 25, 1922, provided the said surrender by the company will be without prejudice to any or all rights of any and all holders of any bond or bonds heretofore issued by it or secured by any of three mortgages now outstanding on the property and franchises of the company. The surrender shall further be without prejudice to the right of said company, with the assent or approval of the Board of Public Works, to continue the sale of its general mortgage bonds, putting the holders of said hereafter sold general mortgage bonds upon an exact parity with the holders of said general mortgage bonds sold prior to Aug. 25, 1922.

The company is required to construct and maintain the supporting substructures of the streets to the extent that its track or tracks are laid above them, and adjacent to its rails, is to construct and maintain a stringer not less than 4 in. wide to keep the top surface of its rails flush with the surface of the street. Wherever the construction, maintenance or operation of the railway results in damage to the street surface, the company is to make repairs at its own expense.

Nothing in the ordinance "shall be deemed to barter away or to impair the police or rate-making powers of the city of Louisville, but, on the other hand, the city expressly retains those powers free and unimpaired."

In the event the Louisville Railway fails or refuses to abide by the terms of the ordinance, it shall be subject to a fine of not less than $50 nor more than $100 for each offense, and each day's failure or refusal shall constitue a separate offense.

Resumption of Franchise Negotiations Planned in St. Louis

When negotiations are resumed on the terms of the franchise under which the reorganized lines at St. Louis, Mo., will operate, officials of the St. Louis Public Service Company, the successor to the United Railways, are prepared to advance further arguments in favor of a 7 per cent rate of return on their investment. Mayor Victor J. Miller has sought to limit the return to 6 per cent. Failure to agree on the rate of return for the company has delayed progress on the new franchise.

C. E. Smith, consulting engineer for the city, in an address before the Civitan Club, declared that under the franchise to be offered the company by the city the municipality will have the right to demand and direct the use by the company of any rapid transit facilities constructed by the city. Mr. Smith was explaining the recent report of a rapid transit committee of the Board of Aldermen recommending the construction of subways in St. Louis. He declared that the logical and economical arrangement would be to operate the subways in conjunction with the present surface lines, but said that should an impasse develop between the city and the railway a rapid transit system with a series of bus lines could be developed to furnish transportation.

Approval Sought for Kansas City Traffic Artery Plan

The Grand Avenue Association of Kansas City, Missouri, an organization composed of property owners and leaseholders on Grand Avenue from Sixth Street Trafficway to Twenty-seventh Street, will ask the Kansas City Public Service Company to remove its tracks on Grand Avenue. It is the plan of the association to make a 99-ft. traffic artery of Grand Avenue, unimpeded by tracks, through the heart of the downtown business district. Notices have been mailed to all property interests, asking their opinion of the proposed change. Negotiations will not be opened with the railway unless most of the property owners favor the plan.

"Chicago" in the Movies

The public is being told of the causes of delays and the efforts required to overcome them in a motion picture just released by the Chicago Surface Lines, Chicago, Ill. The picture is called "Carrying On." It shows typical blockades caused by broken-down vehicles on the tracks, flooded subways under viaducts, fires and snowstorms. The use of emergency equipment in overcoming these difficulties is graphically illustrated.

Another picture will be released by the Surface Lines shortly entitled "Arteries of City Life." It is directed against the parking evil and shows the congestion resulting from the parking of vehicles along main street car lines and too close to loading zones. It also shows how schedules are disrupted by blocked railroad grade crossings, and other interferences. A striking contrast between conditions as they usually exist in the Loop district, where parking is permitted, and as they were during the Eucharistic Congress, when parking was prohibited, is shown.

Inclusive Educational Program at Boston

Because of the continual demand for intellectual advancement among all classes of its employees the Boston Elevated Railway, Boston, Mass., will again offer an educational program with topics for courses selected from those which proved most interesting and profitable last year. The committee this year is confining the program definitely to five months, Nov. 1 to March 31, with provision for one general meeting, five sets of departmental conferences and the holiday season. Among the courses will be a reading course, the purpose of which will be to lay out fifteen minutes or more for daily reading. There will be a course in current events, public speaking, business English, interdepartmental accounts, automotive maintenance and electric railway law. The Boston Elevated Railway has issued an explanatory pamphlet on the educational program for the 1926-1927 season containing a valuable foreword by Edward Dana, general manager.

Ticket Bootlegger Caught in Portland

The Portland Electric Power Company, Portland, Ore., through its attorney, caused the arrest of a man charged with forging car tickets. The man was employed until recently in a local print shop. In his possession when he was arrested was found one of the supposedly forged tickets and a witness told of buying three books for $5 when the price of one is regularly $3.65. Evidence also showed that he had sold more than 1,000 tickets at 3 cents each, when the price is 8 cents. The man under arrest has been held in jail in default of bail set at $2,000.

Georgia Railway Burns the 164th Car

An indication of the extent to which the Georgia Railway & Power Company, Atlanta, Ga., is keeping its equipment and its service up to date is seen in the funeral pyre of the 164th car to be scrapped during the past three years.

Car No. 164 was a double-truck, four-motor car, built in 1902, and had seen 24 years of almost continuous service. The length of the car over all was 38 ft. 6 in., its seating capacity 40 passengers and its total weight complete, when empty, 44,740 lb. It was the last of 34 cars dismantled and burned during September.

Of the 164 cars destroyed in the last three years 130 were single-truck cars, eight were double-truck two-motor cars and 26 were double-truck, four motor street-cars. All had been in service for more than twenty years. Their value new was $597,000. The cars have been replaced by new, modern low-floor safety cars, each with a seating capacity of 48 and a complete weight of 37,380 lb.

Antiquated Cars Cast to Flames in Atlanta

Spreading the Story of "L" Service in Chicago

Employees of the Chicago Rapid Transit Company, Chicago, Ill., through the public speakers' organization, are doing good work in carrying the story of the company's service into public schools, clubs fraternal societies and similar organizations. Since the public speakers' organization was formed less than a year ago, 182 talks have been made to audiences aggregating more than 48,000. At the same time the first aid team has given 176 demonstrations before audiences totaling more than 83,000. Altogether the story of the "L" lines has been put before 358 separate audiences totaling more than 132,000 persons in the last ten months. These activities by the company have been the subject of comment before in the ELECTRIC RAILWAY JOURNAL.

Commission Wants Albany Earnings Segregated

The United Traction Company, Albany, N. Y., in its arguments for a 10-cent fare, must segregate its accounts in every municipality. George R. Lunn, Public Service Commissioner, so ruled at a recent hearing. The question upon which the previous hearing had closed was the admission as evidence of the traction company's valuation of the lines covered by franchises in Rensselaer and Troy. Mr. Lunn said:

> The commission will accept this evidence, but on the understanding that there must be segregation. The fact must be faced that the traction company must segregate its accounts in every municipality before the rates are fixed.

Public Hearing on "L" Lease Scheduled

The Public Service Commission of Pennsylvania recently ordered a public hearing in Philadelphia on Nov. 4 on the joint application of the city of Philadelphia and Philadelphia Rapid Transit Company for approval of the Frankford "L" lease. The lease providing a 30-year extension of the agreement with the Philadelphia Rapid Transit Company was signed by Mayor Kendrick on Oct. 13 despite a considerable amount of criticism. At the Nov. 4 session opposition to the lease will be renewed. Following the Mayor's approval the United Business Men's Association filed a petition with the commission protesting against ratification of the lease.

Future of Detroit's Business District Studied

J. R. Bibbins, consulting engineer, Washington, D. C., has been called to Detroit to undertake for the Detroit Edison Company a comprehensive economic survey of the future development of the rapidly growing business district and such other outside subcenters as are already taking form for the purpose of securing a fairly definite picture of the growth and needs of the present and future districts for central station utility service, particularly district steam heating. The period comprehended by the survey will be five-year intervals up to the year 1950, and an attempt will be made to visualize the portable building development block by block in these areas, taking into account such controlling factors as transportation, traffic, zoning, city planning, land values, living conditions, local trends, industrial employment and output, business population, etc., and the particular economic relation of Detroit as an industrial center to other contiguous or competing centers of the Middle West.

Detroit is rapidly developing its municipal railway and bus transportation system and its interurban facilities. It has ambitious plans for port development, has already developed a major highway plan for its rapidly enlarging suburbs and is entering upon active rapid transit development and facilities for transportation by air. Its municipal area now covers 139 square miles, as compared with 28 square miles in 1900, and its population has grown from 286,000 in 1900 to more than 1,300,000 in 1925, not including tributary suburban population outside of the city limits.

World's Series News Told by Grand Rapids Cars

PATRONS of the Grand Rapids Railway, Grand Rapids, Mich., were served with inning-by-inning bulletins during the world series baseball games. Plays were received by radio and the results by innings, including chief features, such as Ruth's home runs, placed on the bulletin boards of the new electric rail coaches as they passed through Campau Square. Many compliments were received by the company from patrons who enjoyed the games while they rode home.

Railway Proclaims World's Champions

"Rajah" Hornsby, the manager of the Cardinals, and the other members of the St. Louis team certainly received the plaudits of the populace of the metropolis on the Mississippi. It was a grand welcome that city accorded its world champions. Whistles blew, auto horns honked, and if the use of any other noise-making device were overlooked, history as written in the daily papers failed to record it. Many of the people of St. Louis remained up all night to celebrate. The expediency of this may be debatable, but it is a fact that they did it. Joy was unconfined. And when joy is unconfined in St. Louis it apparently knows no limit.

The ELECTRIC RAILWAY JOURNAL has already told how the United Railways did its part in transporting the fans to the baseball park. The company might well have remained content with this contribution to the affair, but it did not. Nothing like that for it. Of course, its men individually took cognizance of the fact that the world's championship pennant will swish in the breeze—when there is a breeze in St. Louis next summer—from the flagpole at Sportsman's park, but the company took official notice of the event in which Alexander the Great, Rog, Bell, Bottomley and others covered themselves with glory. Its most conspicuous contribution to the event was a car proclaiming the world's champions. This car, with its cardinal decorations, was operated over the system at night. It made a big hit. Incidentally the car and the signs it carried on either side conveyed to the public the fact that "corporations have a soul."

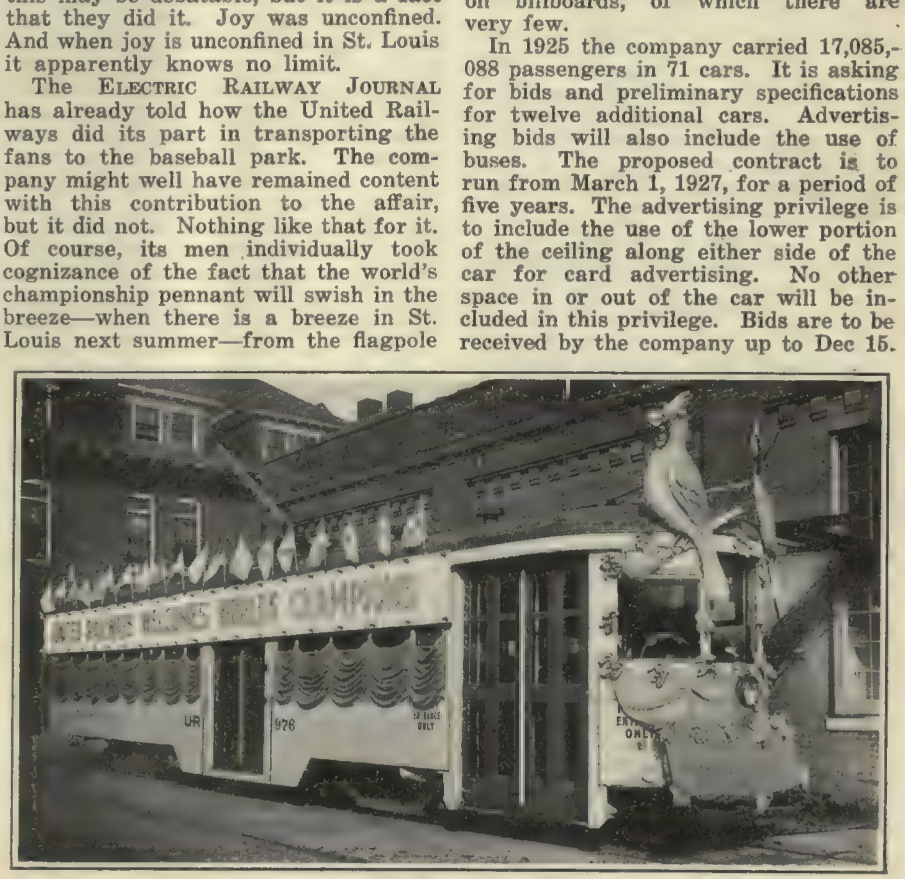
Prompt Decision Expected on New York Fare Referendum

The Court of Appeals of New York decided on Oct. 15 in Albany to hear arguments on Oct. 19 on the appeal in the taxpayer's action for an injunction to prevent the submission of the so-called 5-cent fare referendum in New York City. All other matters before the court will wait until after this issue and the one on the prohibition vote have been heard. It is expected that a decision in each case will be rendered before the date fixed for a recess of the court until after election.

Advertisements to Be Carried in Honolulu Cars

The Honolulu Rapid Transit Company, Honolulu, Hawaii, has voted to carry advertisements in its cars if an attractive bid is received. This reverses a policy of 25 years standing. The situation in Honolulu, with its hotels located 3 to 4 miles out of the city proper and its many tourists, is regarded as unusual. The city frowns on billboards, of which there are very few.

In 1925 the company carried 17,085,088 passengers in 71 cars. It is asking for bids and preliminary specifications for twelve additional cars. Advertising bids will also include the use of buses. The proposed contract is to run from March 1, 1927, for a period of five years. The advertising privilege is to include the use of the lower portion of the ceiling along either side of the car for card advertising. No other space in or out of the car will be included in this privilege. Bids are to be received by the company up to Dec 15.



Crowing About the Cardinals a la Railway

New Providence Plan Contemplates No Subways Now

Robert Whitten, city plan consultant, reported to the City Council of Providence, R. I., on Oct. 12. He advances plans involving an expenditure of $40,000,000 for the relief of traffic congestion in the city and calling for the construction of four 140-ft. boulevard highways across the city, the widening of more than 25 streets and the elimination of several grade street crossings by underpasses. In addition to providing additional street capacity, the plant proposes to create thoroughfares upon which a speed of 30 m.p.h. will be as safe as 15 m.p.h. is on the ordinary city street today. It is also designed to carry through travel around the congested down-town district instead of through streets already crowded.

Mr. Whitten put aside for the present a plan submitted last summer by William W. Lewis for a subway system of two tubes to carry street cars through the congested area as a means of easing the traffic situation. Mr. Whitten said that purchase of land for the widening of highways can be made much more economically now than will be possible 25 years from now, but subways, if needed then, probably can be built in 1950 as cheaply as now.

Dallas-Irving Franchise Extended

The Dallas Southwestern Traction Company was granted an extension of time until Dec. 31, 1927, for the construction of its line from Dallas to Irving by a recent action of the County Commissioners' Court. E. P. Turner, chairman of the board of the company, made the request. This line, it is proposed, will be an electric line connecting Dallas and the Irving territory. The promoters organized a company about fifteen years ago and several extensions of time under the franchise have been granted. E. P. Hopkins is president of the company.

News Notes

Fare Lowered to Stimulate Travel.—A reduction in fare between Harrisburg and Mechanicsburg has been put into effect by the Valley Railways, Lemoyne, Pa. Instead of three 8-cent fares only two will be charged. The new rate will be tried out until Dec. 31, and if increased revenues result the plan will be continued after that date.

Towns Celebrate New Electric Branch.—The first electric train passed through the newly electrified West Hempstead branch of the Long Island Railroad on Oct. 19. The train left the Pennsylvania Station at 2 p.m. and passed through Jamaica, Malverne, Lake View, Hempstead Gardens and West Hempstead to Mineola amid much celebration and cheers. Since 1893 the West Hempstead branch has had shuttle service by steam or storage battery cars between Mineola and Valley Stream connecting at either end with main line trains. The new electrification will mean through service to New York and Brooklyn. One year ago last May the electrification of the Montauk Division to Babylon was completed.

"Stars" Awarded in Atlanta.—Officials of the Georgia Railway & Power Company, Atlanta, Ga., have given out recently more than 600 "service stars," representing a total of 3,000 years of service by the 600 employees. Among the trainmen who received seven stars, having served more than 35 years with the company, are S. B. Lyon and W. B. Kirk. These men are also the oldest trainmen in the company from the standpoint of continuous service. A set of stars, one to be worn on each side of the uniform collar, is issued for each five years.

Fare Hearing Scheduled.—The matter of a 10-cent fare in Syracuse, N. Y., is up again. The Public Service Commission will hear the city's side of the case against the application of the New York State Railways at the New York City offices on Oct. 26. The company is seeking permission to charge a 10-cent cash fare and a 7½-cent ticket fare. The original petition was submitted nearly a year ago. Several hearings have already been held.

Council Blocks New Car Line.—The Common Council of Madison, Wis., passed an ordinance on Oct. 8, signed later by the Mayor, prohibiting the use of Regent Street from Breese Terrace to Prospect Avenue by the Madison Railways for a new car line. The action of the Common Council blocks the plan of the company to abandon its Harrison Street line in favor of the new line on Regent Street from Breese Terrace to Prospect Avenue. The Railroad Commission had approved the company's plan to lay new rails on Regent Street and counsel for the company had contended that under the franchise granted the company in 1892 it had the right to use any city street without first obtaining permission from the city. An appeal by the city from the order of the commission authorizing the abandonment of Harrison Street is now pending in Circuit Court.

Pittsburgh Officials Attend Utility School.—Officials of the Philadelphia Company and its subsidiaries, owners of public utilities in Pittsburgh, Pa., are going to "night school" at the University of Pittsburgh. Ninety men of the Philadelphia Company, including four vice-presidents, registered for the course in public utility administration. Classes are held each Thursday evening under the direction of Dr. Charles Reitell and will be continued throughout the school year. The faculty includes Dr. Reitell, Dr. John G. Bowman, chancellor of the university, and A. W. Robertson, president of the Philadelphia Company.

Railway in Laurel to Continue.—According to Barney E. Eaton, president of the Mississippi Power Company, plans for the rehabilitation of the railway at Laurel, Miss., are being completed. An unofficial announcement made some time ago was to the effect that the railway service of the Laurel Light & Railway Company would be abandoned in favor of buses.

Free Rides in Charleston. — The Charleston Consolidated Railway & Lighting Company, Charleston, S. C., was temporarily "bought" by Kerrison's Department Store on Sept. 25, for one hour and turned over to the public for free rides. This idea was conceived by the officials of one of the city's oldest firms in appreciation of the patronage the shoppers had given in connection with the 95th anniversary sale held in the store during that week. The watchword of the hour on Sept. 25 was "the rides are on Kerrison's, jump aboard."

Tickets in Atlanta Have New Color.—The Georgia Railway & Power Company, Atlanta, Ga., is discarding the green tickets and substituting pink ones. Fifteen pink tickets will be given upon submission of $1, just the same as fifteen green ones heretofore. Any green tickets which have been purchased will be honored upon presentation.

School Fare Ruling on Interurban. The Public Service Commission has approved a new tariff of the Schenectady Railway, Schenectady, N. Y., fixing regulations heretofore applicable on the Troy division only, which provide for the sale of 50-trip one-zone interurban school tickets at a price of $2 a ticket, applicable within zones 2, 3 and 4 on the Saratoga division.

More One-Man Cars in Service.—The number of one-man car lines operated in Milwaukee, Wis., was increased to six on Oct. 3 when the Milwaukee Electric Railway & Light Company placed one-man cars in operation on its Wells-Downer line. Twenty reconstructed cars newly equipped and refurnished were added to the line.

Resident Buyer in Birmingham for Illinois Traction.—The Illinois Traction System, Springfield, Ill., will open a branch office in Birmingham, Ala., according to O. L. Bunn, general manager of the Chamber of Commerce. Leander Poole will represent the company in Birmingham. The Illinois Light & Power Corporation, the principal holding company for the Illinois Traction System, buys heavily in the Birmingham district.

Dallas Railway Takes Interurban Rails in City.—Rails of the Texas Interurban Railway on St. Paul Street and Fairmount Avenue, Dallas, used for the last two years by the Dallas Railway & Terminal Company, are to be purchased by the latter company for a consideration of $46,620. Denton Interurban cars will continue to use the rails, which had been under a lease to the purchasing company that expired Sept. 30.

Coal Carrying Improves Business.—The Evansville, Suburban & Newburgh Railway and the Evansville & Ohio Valley Railway, Evansville, Ind., are hauling considerable coal at the present time, which will prove a good source of revenue for several months to come. Many of the coal mines in Warrick and Spencer Counties along these traction lines are resuming operation and a good many men are employed in mining. The transportation of the products of the mines furnishes one of the best sources of revenue that these lines have from year to year.

Recent Bus Developments

Pinchot Raps Commission

Pennsylvania's Chief Executive Sees Red at Steam Railroads' Proposals to Run Buses

Governor Pinchot of Pennsylvania announced recently that he refused the grant of charters to the Pennsylvania General Transit Company and the Reading Transportation Company, formed by officers of the Pennsylvania Railroad and the Reading Company, respectively, to operate bus and truck lines.

The Pennsylvania company asked for a charter covering 55 of the 57 counties of the state, the Reading for charter rights in 24 counties. The Reading's application was for a $1,000,000 corporation, while the capital stock of the proposed Pennslyvania Bus Company was half that amount.

The Governor said in part:

> I decline to approve the charter applications of the Philadelphia & Reading and the Pennsylvania Railroads to operate bus and truck lines over the highways of the state, as recommended by the Public Service Commission, for the reason that these applications are the first steps toward securing a monopoly of bus transportation over the highways of this Commonwealth.
>
> These charters appear merely to grant the right to run buses and trucks over the highways and stipulate that lines cannot be run over any definite route or routes until after the Public Service Commission has granted the right to operate in each individual case. In fact, they are the opening wedge in handing the highways of Pennsylvania over to the railroads.
>
> Such blanket grants as these have never been made before. They can have but one purpose. It is no answer to say that other bus and truck lines might be permitted to operate. The history of similar cases demonstrates beyond question that competing lines would be crushed out or bought out (with increased charges to the public), that the railroads would absorb them as they did canals, and that the formation of a railroad bus and truck line monopoly would scarcely even be retarded.
>
> If the present majority of the Public Service Commission could be trusted to protect the rights of the citizens of Pennsylvania against encroachment or extortion by railroads, street railroads, electric and other public utility corporations, the apparent safeguarding of public rights in those charters might have some meaning. Under the actual circumstances it has none. If I were to sign those charters, the commission could complete the railroad monopoly by granting certificates of public convenience without anybody being able to stop it. For this reason alone, even if these charter applications did not involve a fundamental public policy, which they do, they ought not to be approved.
>
> The time to stop the intended control of our highways by the railroads is before it starts. These charter applications on behalf of the Pennsylvania and the Reading Railroads will be followed by similar applications from other railroads. Since the rights of our citizens are not otherwise protected, the Governor must protect them and so long as I am in office the Governor will, to the full extent of his power.

The commission's letter, stating the facts in the case, and signed by Chairman W. D. B. Ainey, was in part as follows:

> The commission's approval of these applications merely clothes these companies with lawful authority to furnish service of this character if and when by subsequent order, the commission shall have determined that the public necessities require the furnishing of bus service as auxiliary or supplemental to service presently being furnished, whether by rail carrier or otherwise.
>
> The commission's approval of these incorporations will in no wise relieve them, in seeking authority to operate over specific routes, of the burden imposed by law of affirmatively establishing by proper testimony that the particular service which they propose to furnish in any given case is necessary for the service, accommodation, convenience and safety of the public.
>
> When such applications are presented the commission will require, as it does in all similar cases, that copies of the petitions be served upon all existing carriers engaged in furnishing a similar type of service in the territory, and these carriers will be afforded full opportunity to protest and be heard in public hearings.
>
> At the present writing seven applications for operation over specific routes have been filed in the interest of the Pennsylvania General Transit Company and four in the interest of the Reading Transportation Company. Of the former, three have been approved, one refused and three are pending. Of the latter, all four cases are pending. The commission's refusal, above noted. was in the application for the carriage of persons between Waynesburg and Washington ,and its reason therefor was that reasonably adequate service of this character is presently being there furnished by an existing certificate holder.

The proceeding is of interest because of the point of view taken by the Governor, because the electric railways appeared in opposition to the plans of some of the applications, which appeared to threaten the entrance by the railroads' bus lines of territory in which trolleys were operating, and because of the pronouncement of the commission of its intention to protect the rights of existing carriers.

Would Operate Buses Only

The Omaha & Lincoln Railway & Light Company, Ralston, Neb., has asked the State Railway Commission for authority to tear up the last of its trackage, that between Omaha and Ralston. The company formerly operated cars to Papillion, but a year ago was allowed to abandon the track and service and substitute buses. A little later it was authorized to abandon railway service between Omaha and Ralston, save two cars a day, buses having been used for supplemental service for two years. Now the public authorities propose the reconstruction of a viaduct in Omaha over which the company's tracks run, and as this will call for an expenditure that the railway regards as prohibitive its officers desire to abandon railway operation and furnish transportation entirely with buses.

Doylestown Bus Project Argued

The application of the Philadelphia Rapid Transit Company, Philadelphia, Pa., for certificates of public convenience to operate bus lines from Philadelphia to Doylestown and to Cypress Avenue and Cadwallader Avenue, Montgomery County, was heard by the Public Service Commission on Oct. 19. The Bucks County application is new, but the Montgomery County application is for an extension of service already existing. The company in this has asked for approval of additional rights to permit the operation of its buses from Broad Street and Olney Avenue, operating over route V to Montgomery County. A. B. Millar, of the Philadelphia Rapid Transit Company, declared there was need for the additional line. The Bucks County line was opposed by the Reading Transit Company.

Agreement Reached on White Plains-Tarrytown Service

The Third Avenue Railway, New York, and the city authorities of White Plains have reached an agreement whereby buses will be run for five years on all routes now covered by trolleys. Buses will reestablish service to Mamaroneck from White Plains on a 20-cent fare, but trolleys will be retained to Tarrytown with fare increased to 10 cents.

Clang of the Gong Replaces Honk of the Horn in Alliance

The honk of the horn of the bus has been replaced by the clang of the trolley gong on local lines of the Stark Electric Railroad at Alliance, Ohio, for after nearly a year of operation the Stark Electric has abandoned its city bus lines.

When six new gray buses fresh from the factory were received in Alliance a year ago wheels were lifted from the ground and the high-pressure tires were replaced with balloons. Thus equipped, buses began operating. For making this experiment with balloon tires, the Stark Electric had a tire proposition from the manufacturers which was considered by company officials to be very reasonable.

It is true that the four buses which replaced the three street cars at Alliance took in more in gross than did the local trolleys, but the cost of operating the buses more than offset their added earning power. Not only that, but the Stark Electric had operated its local street cars over the route used by its interurban cars, so that there was an important element of economy here which worked to their benefit.

With two branches of car tracks in the city, it has now been established that street cars can be operated at a cost much less than that for buses. By rearranging schedules it was necessary to secure only three trolley cars to give local service over two lines. For this service one-man cars were leased. These cars do not represent the best of their type, but they are proving fairly popular with patrons. If the railway service as restored with one-man cars proves profitable Stark Electric officials plan to purchase new cars for the city service. Routes over which the buses operated ran the mileage for each bus up to about 40,000 miles in less than a year, a severe drain upon the physical equipment.

Buses Serve Davenport.—The Tri-City Railway of Iowa put into regular service on Oct. 3 the new buses recently purchased as an added improvement to the street transportation service of Davenport. Six Yellow coaches seating 21 passengers and two 25-passenger Mack gas-electric coaches are now being used. The fifteen drivers who are now operating the buses were put through a rigid period of training before the buses were put into public service.

Financial and Corporate

Receivership Ended in Kansas City

Deeds that passed on Oct. 14, terminated the receivership of the Kansas City Railways, Kansas City, Mo., and turned the property over to the new Kansas City Public Service Company.

To afford time for certain court orders to be drawn Judge Stone had fixed 2 o'clock Thursday afternoon as the hour for the delivery of the deeds. This ceremony marked the end of a receivership, in which adherence to a policy of public service rebuilt a property virtually bankrupt.

The document was executed by John T. Harding, special master commissioner, acting for the federal court, and by Powell C. Groner, Mr. Groner having acted as bidder at the foreclosure sale by the Kansas City Railways through the signature of Frank C. Niles, vice-president, and the Kansas City Public Service Company, which received title. Copies of the deeds were filed immediately in Kansas City, Mo.; Kansas City, Kan., and Independence.

The revenue stamps required reached the unusual total of $22,000.

The receivership having extended a month and a half beyond the date estimated when salary allowances were made, Judge Stone authorized payment to the receivers, Fred W. Fleming and Francis M. Wilson, and their counsel, James E. Goodrich, for the extra period. The receivers were paid at the rate of approximately $31,000 a year. Counsel received 20 per cent less.

To the Kansas City Public Service Company passed full possession of the property, subject to the supervision of the State Public Service Commission and to franchise conditions, such as provide for the board of control.

$300,000 Theoretical Deficit on Municipal Line

San Francisco Civic Body Recapitulates Figures of Local Railway on the Basis of Private Operation

An analysis of the monthly operating statements of the San Francisco Municipal Railway for the fiscal year 1925-26, contained in the *City*, issued by the San Francisco Bureau of Governmental Research, shows a book profit of $21,395. This is an increase of $15,009 over the preceding year's profit, for which reduced debt charges are largely responsible. The figures are contained in the accompanying table.

The total operating revenue was approximately $3,400,000. This is $132,000 more than for 1924-25. This was practically absorbed, however, by an increase of $125,000 in operating costs, $94,000 of which was for conducting transportation.

The bureau explains:

> A change in the method of setting up reserve funds for depreciation and for accident and damage claims, effective during the last two months of the year, resulted in reducing by about $1,000 the amount which would have been set aside for these purposes under the old method.
>
> Comparison charges, shown in the accompanying table, are taxes which the road would bear if privately owned but which the publicly owned road does not pay. The charter requires, however, that account shall be taken of these for comparative purposes. These charges are partly offset by bond redemption payments which a privately owned road would not ordinarily be called upon to make.
>
> The table showing the operations of the system in detail is subject to adjustment after the accounts are audited which may make minor changes in the totals.

SAN FRANCISCO MUNICIPAL RAILWAY

Last two fiscal years ended June 30, 1925-June 30, 1926.
(Compiled by Bureau of Governmental Research from Official Monthly Reports.)

	1924-25	1925-26	Increase or Decrease
Passenger revenue	$3,268,383	$3,395,186	$126,803
Miscellaneous revenue	13,115	18,671	5,556
Operating revenue	$3,281,498	$3,413,857	$132,359
Operating Expenses:			
Ways and structures	115,074	136,604	21,530
Equipment	197,619	204,046	6,427
Power	464,990	488,812	23,822
Conducting transportation	1,600,499	1,694,960	94,461
Workmen's compensation	45,656	41,324	*4,332*
Other general and miscellaneous	149,417	152,006	2,589
*Accident and damage claims	121,247	102,010	*19,237*
Total operating expense	$2,694,502	$2,819,762	$125,260
Net operating revenue	586,996	594,095	7,099
*Reserve for depreciation	266,062	260,403	*5,659*
Reserve for accident and damage claims	....	4,609	4,609
Total charges to reserve	$266,062	$265,012	*$1,050*
Operating income	320,934	329,083	8,149
Interest received on securities owned	44,495	43,718	*877*
†Compensation fund dividend	28,535	22,727	*5,808*
Total non-operating income	73,130	66,445	*6,685*
Gross income	$394,064	$395,528	$1,464
Interest on funded debt	186,678	177,133	(*a*) *9,545*
Surplus	$207,386	$218,395	$11,009
*Redemption of debt	201,000	197,000	*4,000*
Surplus	$6,386	$21,395	$15,009
‡Comparison charges—taxes unpaid	311,548	324,910	13,362
Theoretical deficit	$305,162	$303,515	*$1,647*

* B. P. W. accounts included in "Depreciation Reserve."
† Difference between reserve charges as operating expense and actual expenditures.
‡ Estimate by bureau
(*a*) Approximately $17,500 of this amount was expended from 1910 and 1913 bond funds.

Valuable Stock Rights for Montreal Holders

The long-anticipated issue of new stock by the Montreal Tramways, Montreal, Que., has at last materialized. For every four shares now held the shareholders will have the right to subscribe for one new share at $125. The present common share capitalization of the company is $4,000,000; thus the new financing will increase the common stock outstanding to $5,000,000.

Payment for the new issue will be made in three installments: 25 per cent on Dec. 1, 1926, 25 per cent on Dec. 31, 1926, and the remainder on March 31, 1927. The new shares will carry dividends for the quarter ended March 31, 1927.

This operation marks the first financing by means of a stock issue in more than ten years. The last stock issue made was in the fiscal year ended June 30, 1916, when 10,000 shares were issued and allotted to shareholders at par, thereby increasing the issued capital to $4,000,000, at which it has remained up to the present time.

Last year the funded debt structure of the company was simplified by the authorization of $100,000,000 of general and refunding bonds. An issue of $17,826,500 series A, carrying 5 per cent interest, was made to redeem $17,650,000 outstanding debenture stock at 101, and an issue of series B to the amount of $2,500,000 was also made, the proceeds of which were used partly for capital expenditures and partly to replace $1,750,000 of first mortgage bonds. These issues and the issue of first mortgage bonds gave the company a total mortgage debt of $41,823,343 at the close of the last fiscal year.

The new financing will net the company $1,250,000 to be used in various extensions and other capital expenditures. Since 1920 the stock has been on an annual dividend basis of 10 per cent. The stock has been quoted recently around 170.

Rockford Properties Ordered Sold

A court order for the sale within 30 days of all properties of the Rockford City Traction Company, Rockford & Interurban Railway and Rockford, Beloit & Janesville Railway, all of Rockford, Ill., has been entered by Judge E. D. Shurtleff in the Winnebago County Circuit Court.

The petition for the order for sale was presented by the Continental & Commercial Trust Company, Chicago, trustees for first mortgage bond holders, and the order was issued without objection. Charles W. Ferguson, master in chancery, will be in charge of the sale of the properties. Milton Ellis, Beloit, Wis., railway banker, is expected to bid in the road, controlling as he does the majority of outstanding bonds, for which he paid about 23 cents on the dollar for $1,300,000 of obligations. Simultaneous with the action in the Rockford courts, H. C. Van Oven, receiver for the Rockford, Beloit & Janesville lines, filed a petition for the sale of the northern interurban line. This plea was granted. That sale will take place at the same time as the other railway properties.

Foreclosure Sale for Norwich Property Set

Judge Jennings at a recent hearing in the Superior Court at Norwich, Conn., authorized foreclosure proceedings in connection with a mortgage against the Groton & Stonington Traction Company of that city. The sale under foreclosure has been set for Nov. 22 at New London to dispose of the property.

The sale is the outcome of proceedings started in December, 1924, by Ernest E. Rogers, state treasurer, as trustee for the owners and bondholders of the Groton & Stonington Traction Company, on bonds secured by a mortgage made on July 1, 1904.

Coral Gables May Purchase Its Railway

Plans are under way by the developers of Coral Gables, Fla., a Miami suburb, to divest themselves of certain properties there so as to secure funds for further new work on their part. The developers offer taxpayers the two street railway lines for $1,782,730; the golf clubs and courses for $1,750,000 and the Venetian Casino and pools for $300,000. In order to put through this program it is proposed by the city commissioners to hold an election to authorize an issue of bonds to the amount of $4,500,000, about $4,000,000 of the proceeds of the sale to go to the Coral Gables Corporation, developers of the resort, and $500,000 to be used for public improvements. George M. Merrick, president of the corporation, declared it to be his intention to use the money realized from the sale in carrying on a program of development. According to the Coral Gables Chamber of Commerce the City Commission favors the purchase of the utilities from the private owners and will meet during the week ended Oct 30 to take final action for the consummation of the deal.

California Beach Sale Under Way

Negotiations are under way for the sale by the Pacific Electric Railway, Los Angeles, Cal., of its resort properties at Redondo Beach. The impending sale was confirmed by D. W. Pontius, vice-president and general manager of the railway. He stated that the Charles G. Andrews Realty Company was handling the deal. It is reported that the deal, if consummated, will involve approximately $2,000,000.

The property is known as the railway's amusement holdings. It consists of a bathhouse, dancing pavilion, restaurant, and other buildings, as well as the land on which they stand.

The property passed to the railway from Henry E. Huntington about fifteen years ago when it purchased the Los Angeles & Redondo Railway. A portion of the property is under lease, but the company has been operating the pavilion and the bathhouse.

Improvement Noted in Evanston Operation

For the year ended Dec. 31, 1925, the Evanston Railway, Evanston, Ill., reports a balance of $70,458, against $59,095 for 1924. The accompanying table shows revenue and expenses for last year compared with the year previous. The Evanston Railway operates 10 miles of line, controls and operates the North Shore & Western Railway and connects with the Chicago Surface Lines.

EARNINGS STATEMENT OF EVANSTON RAILWAY

	1925	1924
Gross operating revenue......	$306,178	$290,607
Other sources..............	8,152	4,137
Total revenue............	$314,331	$294,745
Operating expenses..........	184,132	181,005
Taxes.....................	28,423	24,363
Total expenses...........	$212,555	$205,368
Gross income..............	$101,775	89,376
Interest on funded debt......	30,355	28,252
Interest on floating debt.....	540	1,669
Miscellaneous..............	422	360
	$31,317	$30,281
Balance..................	$70,458	$59,095

Changes in Penn-Ohio System Being Worked Out

Revamping of the corporate structure of the Penn-Ohio system, announced in the last annual report of the Republic Railway & Light Company, New York, is proceeding rapidly. Upon completion of these plans there will be only one holding company for the system, instead of three as at present. This holding company will control four main operating groups: Pennsylvania Power for the electric properties in Pennsylvania; Pennsylvania-Ohio Power & Light for the Ohio electric properties; Ohio River Edison, operating the most important power-producing units of the system, and a fourth company to have charge of the railway properties formerly owned by the several holding companies.

According to the *Wall Street Journal* much progress has been made on consolidation and simplification of the subholding companies and of operating companies looking toward the ultimate goal of four main operating companies. Pennsylvania-Ohio Power & Light has eliminated properties operating in Pennsylvania and now has only electric properties in Ohio. The newly formed Pennsylvania Power Company now operates the electric properties in Pennsylvania. These two companies, comprising the Penn-Ohio system, receive the majority of their power from Ohio River Edison.

The majority of the electric railways are now controlled by one company, Pennsylvania-Ohio Electric Company. Possibly in the distant future these traction securities will be distributed to Penn-Ohio Edison stockholders, thus eliminating all but electric power companies from the system.

Benefits from this consolidation program have already manifested themselves through ability of the operating companies to finance on favorable terms. Last summer Ohio River Edison was able to place an issue of $4,000,000 5 per cent bonds to yield 5.50 per cent, and Pennsylvania Power placed $3,800,000 30-year 5 per cent first mortgage bonds to yield 5.13 per cent.

Quarterly Earnings Reports Likely from Insull Railroads

Quarterly earnings reports to stockholders may soon become a fixed policy of the managements of the Chicago Rapid Transit Company; Chicago, North Shore & Milwaukee; Chicago, South Shore & South Bend and Chicago, Aurora & Elgin Railroads—the four electric railroads in the Chicago district controlled by Samuel Insull and associates.

The policy of all these companies heretofore has been to issue only annual reports, but the issuance on Oct. 18 of a quarterly statement with the dividend checks of the Peoples Gas & Coke Company is regarded in financial circles of Chicago as significant of a new program presently to be adopted with regard to the corporate publicity of the Commonwealth Edison, Public Service of Northern Illinois, Middle West Utilities and Midland Utilities companies as well as that of the electric railways.

Change Effected in Capital Structure.—The Danbury Power & Transportation Company, Danbury, Conn., formerly the Danbury & Bethel Traction Company, has been authorized to change its capital from $500,000 to 5,000 shares of stock of no stated par value.

Authorizes Sale of Land.—Robert W. Perkins, receiver of the Shore Line Electric Railway, New London, Conn., has been authorized to sell six tracts of land owned by the company in Essex, Preston and Norwich. The sale is the result of action brought by the United States Trust Company, New York, and the Old Colony Trust Company, Boston, Mass.

Revenues Show Gain.—Revenues of the Community Traction Company, Toledo, Ohio, in September showed a gain of more than $3,400 over those for the corresponding month last year. Total revenue in September was $258,919 compared with $255,550 for a similar month last year. The gain was made in spite of "open weather." Mr. Johnson said the improvement was due, he thought, to continual improvements in service and the chartered bus service which has proved popular since its installation on Sept. 1.

Net Income Increases.—For the three months period ended Sept. 30, 1926, the total operating revenues of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., was $11,673,905, against $11,228,732 for a similar period ended Sept. 30, 1925. Total operating expenses increased from $7,338,227 to $7,442,816 for a similar period this year. The net income after the consideration of income deductions amounted to $1,732,554 for the three months period ended Sept. 30 this year, against $1,490,688 for the similar three months period of 1925.

Seattle Not Liable to Tax Portion.—Contending that the city of Seattle, Wash., is not liable to any portion of the 1919 street railway taxes and cannot legally pay such taxes from either the general fund or any special fund, Corporation Counsel T. J. L. Kennedy and his first assistant, Ray Dummet, recently argued the city's appeal in the tax case before the United States Circuit Court of Appeals. James B. Howe, counsel for the Puget Sound Power & Light Company, which won a decision in the District Court to the effect that the city is obligated to pay three-quarters of the 1919 tax, approximately $543,000, argued that the city had agreed by ordinance, held valid by the State Supreme Court, to pay its portion of the taxes. Taxes and interest on the street railway for the year 1919, totalling approximately $650,000, were paid by the company under protest. The company is seeking to have the city pay three-quarters of this amount, or the taxes for the nine months of 1919 that the city had possession of the carlines.

Short Massachusetts Line Suspends.—The Templeton-Gardner Street Railway operated its last car on Oct. 9. The service was replaced by buses on Oct. 10. The railway has been in existence since 1900. The road was finally acquired by the Northern Massachusetts Street Railway and thence passed into the hands of the present company to include only the East Templeton to Baldwinville and Gardner to Riley's Switch routes. The East Templeton to Baldwinville line was abandoned last summer.

Surplus Lower.—For the period from Jan. 1 to July 31, 1926, the gross earnings of the Lake Shore Electric Railway, Sandusky, Ohio, were $1,873,262, against $1.852,849 for a similar period in 1925. Operating expenses and taxes increased from $1,512,120 in 1925 to $1,606,916 in 1926. After the consideration of interest, the surplus for the period from January to July, inclusive, was $13.244. against $84,959 for a similar period last year.

Seeks Permission to Sell Bonds.—Authority to issue and sell $56,000 of first and refunding 5 per cent bonds has been asked of the Indiana Public Service Commission by the Evansville & Ohio Railway, operating railway lines from Evansville, Ind., to Mount Vernon, and Henderson, Ky. G. R. Millican, vice-president and general manager of the company, said the money will be used to pay for general improvements and for six new interurban cars which were bought some time ago.

Service Discontinued.—The Huntingdon, Lewiston & Juniata Valley Traction Company discontinued service on Oct. 7 in the borough of Huntingdon, Pa., on its line, which is 1.7 miles long. The service ended with F. Blair Isenberg, general manager, announcing plans to tear up and scrap the track, property and all holdings.

Personal Items

Personnel of New Kansas City Company Announced

When Judge Stone had approved the transfer of the Kansas City Railways, Kansas City, Mo., to the Kansas City Public Service Company on Oct. 14, W. C. Woolfolk, president of the new company, announced the following operating staff, with various advances in title and increased authority:

F. G. Buffe, vice-president in charge of operations.

J. A. Harder, secretary and treasurer.

L. M. Boschert, assistant secretary.

Neal S. Doran, comptroller and assistant treasurer.

Charles L. Carr, general solicitor in charge of legal and claim department.

D. L. Fennell, general superintendent of transportation.

R. W. Bailey, general superintendent of maintenance.

E. E. Stigall, purchasing agent.

E. B. Sanders, manager commercial department.

A. T. Bagley, superintendent department of personnel.

J. D. Cornell, freight traffic manager.

D. E. Druen, superintendent of power.

H. W. Smith, superintendent of way and structures.

C. A. Kincade, superintendent of distribution.

R. S. Neal, superintendent of equipment.

F. C. Lynch, superintendent of bus maintenance.

I. R. Carson, assistant superintendent of transportation.

H. M. Smith, assistant superintendent of transportation.

H. H. Cloyd, assistant to Mr. Buffe.

A separate construction department is being organized, with A. E. Harvey as superintendent of construction.

Senator Francis M. Wilson and Col. Fred W. Fleming, co-receivers, have, of course, relinquished their duties. Colonel Fleming will assume management of the Central Surety & Insurance Corporation, of which he is president. He is also vice-president and treasurer of the Willock Realty & Loan Company and president of the Golden Rule Baking Company.

Senator Wilson plans a hunting trip in Platte County, the first real vacation he has had for thirteen years. During the period of the receivership, Senator Wilson was away from the office only 60 days, 30 of which were spent in pursuit of bus knowledge. After Jan. 1 he expects to open a law office in Kansas City, "a modest sort of an office where if any client should come, he would be courteously received."

W. J. Wright a Public Service Corporation Counsel

Wendell J. Wright has been appointed assistant general counsel of the Public Service Corporation of New Jersey and its subsidiary companies.

Mr. Wright in 1898 became associated in his New Jersey and New York law practise with Edmund W. Wakelee, now vice-president of Public Service in charge of law. Later he founded the firm of Wright, Vander Burgh & McCarthy, with offices in Hackensack.

In 1905 Mr. Wright was appointed counsel to the Bergen County Board of Freeholders and in 1909 was appointed by Governor Fort first judge of the First District Court of Bergen County. Later he became prosecuter.

Mr. Wright was one of the organizers of the Closter National Bank, of which he was a director. He also is a director of the North Jersey Title Insurance Company and its general counsel.

John S. Bleecker—Public Utility Consultant

John S. Bleecker is leaving Day & Zimmermann, Philadelphia, Pa., to establish offices at 910 Finance Building, that city, as industrial and public utility consultant, but will retain certain connections with the industrial management department of Day & Zimmermann. Mr. Bleecker has been connected with Day & Zimmermann for the last two years, but was associated before that with the Indianapolis, Columbus & Eastern and the Columbus, Newark & Zanesville lines, operated jointly for the bondholders by the Day & Zimmermann organization. Of these roads he was general manager. Mr. Bleecker was formerly manager of the New Orleans Railway & Light Company, New Orleans, La.: the Columbus Electric Company, Columbus, Ga., and the Columbus Railroad. In addition to serving Stone & Webster on the Columbus properties he was affiliated with that concern in its home office in Boston and at Seattle, Paducah and Houghton.

Elmer Ambrose Sperry, Electric Railway Pioneer, Honored

Elmer Ambrose Sperry, New York, inventor and early builder of electric railways, has been awarded the John Fritz Gold Medal for 1927 for the development of the gyro-compass and the application of the gyroscope to the stabilization of ships and airplanes. The award was made unanimously on Oct. 15 by the board of sixteen representatives of the American Societies of Civil, Mining and Metallurgical, Mechanical and Electrical Engineers. The presentation of the medal will take place on Dec. 7, in New York, at the annual meeting of the American Society of Mechanical Engineers.

Shortly after Mr. Sperry's early successes in mining machinery he founded the Sperry Electric Railway, Cleveland, Ohio, built electric railway motors and controllers and installed several of the early electric railways put in operation in the later '80s. Subsequently he sold his electric railway patents to companies now represented by the General Electric Company.

Mr. Sperry is a charter member and one of the founders of the American Institute of Electrical Engineers and the American Electrochemical Society. He is also a member of the American Society of Mechanical Engineers, American Chemical Society, Society of Naval Architects and Marine Engineers, Society of Automotive Engineers, and many others.

Cleveland Officials Advanced

Col. J. H. Alexander, the New President, and P. E. Wilson and R. W. Emerson, New Vice-Presidents, All Men of Long Experience Schooled Under Late Mr. Stanley—Their Careers Reviewed Briefly

R. W. Emerson

J. H. Alexander

P. E. Wilson

COL. JOSEPH H. ALEXANDER, newly elected president of the Cleveland Railway, Cleveland, Ohio, succeeding the late John J. Stanley, takes at the age of 42 one of the most important public utility posts in the country. At 35 years of age he was advanced to the position of vice-president of the company, similarly one of the youngest ranking officials in such work. Responsibility is nothing new to Colonel Alexander. The very year of his graduation from the Case School of Applied Science at Cleveland he took a job with Tom L. Johnson's Municipal Traction Company at Cleveland as chief engineer, a sizable job for a youth of 22 years.

The following four years witnessed in Cleveland a bitter struggle for supremacy between rival railway systems, several in number, and in that conflict Mr. Alexander first came into prominence. Standing loyally beside Johnson and his chief aid, the late Fred Goff, young Alexander fought courageously. That historic fight terminated in 1910 with the adoption of the Tayler grant, a document of great merit, the provisions of which still govern railway operation in Cleveland.

At various times during the railway fight Mr. Alexander prepared for Johnson numerous surveys of the various competing car systems and made many tests of their facilities and equipment. Shortly after the franchise settlement in Cleveland the young engineer went to Pittsburgh. There, at the age of 26, he became assistant to the general manager of the Pittsburgh Railways. Two years later, in 1912, he was back in Cleveland as chief engineer in the office of Peter Witt, then the city's traction commissioner.

Mr. Alexander proved an invaluable aid in the commissioner's office and in so doing attracted the attention of Mr. Stanley. So in 1916 Mr. Stanley made him assistant to the president. His progress was rapid in this new position and it wasn't at all surprising when in April, 1919, there was another promotion. At that time he was elected to the office of vice-president.

Less than a year after going with the railway in 1916 the Colonel responded to the nation's call to arms, receiving an appointment of major in the administrative section of the construction division of the United States army. He entered service on Nov. 1, 1917, and continued in the army until November, 1918. Early in 1918 he was promoted to the rank of colonel.

A page from war records might serve best to describe Colonel Alexander's work as a member of Uncle Sam's fighting forces. Here it is:

> He established and approved all labor rates and supervised all labor matters and conditions on all army construction projects in the United States and Porto Rico, on which as many as 400,000 laborers were engaged at one time and which in the construction division alone numbered approximately 500 and aggregated $1,400,000,000 in value.
>
> He conferred with labor delegations, determined prevailing union rates and conditions, interpreted labor agreements, conferred with the war labor policies board, co-operated with the United States employment service in the procuring and distributing of workmen on the various projects and imported approximately 13,000 Porto Ricans and 2,600 Nassauans on ships which were assigned to and operated by the construction division.
>
> He conferred in an advisory capacity for many months with the cantonment adjustment commission (later known as the emergency construction wage commision), and thereafter was made the army representative on the emergency construction wage commission and on the general committee of war labor adjustment.
>
> At the time of the signing of the armistice he had been nominated by representatives of labor and by representatives of employers as chairman of the national committee on standardization of wages for building trades employers. He made approximately 300 speeches on 100 total jobs to approximately 200,000 workmen.
>
> In substance, he established and supervised the carrying out of the fundamental standards and policies for the general administrative work of the construction division of the army.

The foregoing leaves no doubt as to the splendid war record made by Colonel Alexander. He returned to Cleveland shortly after the war and was back at his job of assistant to Mr. Stanley for only a short time before he was elevated to the vice-presidency. As stated previously, he was 35 years old when he ascended to the office of vice-president, and now at 42 years becomes president.

In 1925, when buses were added to the service of the Cleveland Railway, Mr. Stanley assigned to Colonel Alexander the job of directing their operations. Today the bus is one of the chief cogs in the system of the Cleveland Railway.

As a boy Colonel Alexander was sent to a preparatory school in Canada. Some few years later he went to the University of Minnesota. After three years of study there he enrolled in the Case School of Applied Science, Cleveland, to complete his technical education. That was in 1901. In 1905 he was graduated with a degree of B.S. in mechanical and electrical engineering, and the following year the same institution conferred a fellowship upon him.

He is president of the Ohio Safety Council and likewise president of the Cleveland Safety Council. It might be well to point out that largely through his efforts the annual International Safety Congress, with its 10,000 delegates, met in Cleveland last year. He is an ex-president of the Cleveland Engineering Society and long has been prominent in civic movements here.

Paul E. Wilson

Other important changes in the organization were the advancement of Paul E. Wilson to the post of vice-president and of Ralph W. Emerson to a similar office. Mr. Wilson previously was secretary of the company and Mr. Emerson general manager. Each of these officials retains his former title in addition to the new one. Mr. Wilson has been secretary of the company since 1921. In that post he succeeded the late Henry J. Davies. Before that he had been assistant secretary of the company for two years and previous to that, from 1910, had been secretary to Mr. Stanley. While he was still attending high school Mr. Wilson worked for the railway as office boy and clerk for two summers. Upon his graduation he was for three years clerk to the superintendent at the operating headquarters of the company. He attended law school at Western Reserve University for two years and did newspaper work for the Cleveland *Leader* and the Cleveland *Press* for two years before becoming secretary to Mr. Stanley. Mr. Wilson has long been the point of contact between the company and the public through the press, although the other officers of the company were always accessible to the newspapers. Mr. Wilson is not yet 40 years old.

Ralph W. Emerson

Mr. Emerson has been general manager of the company since 1922. In that year he succeeded in that post the late George L. Radcliffe, who had been vice-president and general manager. Before that, from 1915 on, he had been assistant superintendent of the company. Mr. Emerson's experience in the railway field has been varied and rather unusual. He was graduated in 1906 from the Case School of Applied Science as a mechanical and electrical engineer. Immediately thereafter he joined the engineering forces of the Cleveland Railway. In 1910 he resigned from the service of the company to install and operate the power plant of the New York & North Shore Traction Company at Roslyn, L. I. When this Long Island road was placed in service Mr. Emerson was made general superintendent. He continued in that capacity until 1915, when he rejoined the forces of the Cleveland Railway. He is 41 years old.

The promotions by the Cleveland Railway advance to the principal operating and executive posts of the company men all of whom are young, but officials well versed in the affairs of the company who in addition have the confidence and the respect of the public of Cleveland gained through years of operation under the late Mr. Stanley and fostered by each of the operating officials that served with him in directing the property.

A. C. Mellette, investigator for the claim department prior to his resignation early this year, has returned to the Los Angeles Railway, Los Angeles, Cal., and will once more act as an outside investigator. Since leaving the company Mr. Mellette has been with the claim department of the St. Louis & San Francisco Railroad at Memphis, Tenn.

New Claims Attorney for All Insull Railroads

G. T. Hellmuth, for many years chief counsel for the Chicago, North Shore & Milwaukee Railroad and more recently of the Chicago Rapid Transit Company, has been appointed general claims attorney for the entire group of Insull transportation companies in and around Chicago. He will have complete supervision over the claims departments of the Chicago, North Shore & Milwaukee, Chicago Rapid Transit, Chicago, South Shore & South Bend and Chicago, Aurora & Elgin Railroads. His office will be located in the general executive headquarters of the four companies at 72 West Adams Street, Chicago. Mr. Hellmuth is a graduate of the John Marshall School of Law in Chicago and the greater part of his business career has been spent with the North Shore and Rapid Transit lines in various legal capacities.

Officials of Cleveland-Southwestern Advanced

Frank E. Hull, superintendent of the northern division of the Cleveland, Southwestern Railway & Light Company, Cleveland, Ohio, has been named superintendent of the southern division of the system. John Nester, general superintendent, will take over the superintendency of the northern division. H. A. Humphrey, train dispatcher of Elyria, also has been promoted to trainmaster.

Paul A. Beique has been appointed a member of the Montreal Tramways Commission, Montreal, Que. In this capacity he succeeds the late Paul E. Mercier, who had occupied the position for only about four months. Mr. Beique is a civil engineer.

Howard Wright, formerly of the claims department of the Puget Sound Power & Light Company, Seattle, Wash., has been appointed safety engineer for the Southwestern District to succeed the late Capt. David J. Kinzie.

J. D. Whittemore, vice-president and general manager of the Monongahela West Penn Public Service Company, Fairmont, W. Va., was elected president of the Public Utilities Association of West Virginia at the ninth annual meeting of that body, held recently at the Hotel Kanawha, Charleston, W. Va.

E. B. Gunn, superintendent of transportation and equipment of the Western Ohio Railway, Lima, Ohio, is resigning his position after a service of eight and one-half years with that property. His office was located at Wapakoneta. In the past few years the Western Ohio Railway introduced many economies in the mechanical department, reducing the cost of maintenance, increased its freight business and strived with success for a clear record in the matter of accidents. In all of this work Mr. Gunn took an important part.

Obituary

R. E. Breed

Richard Edwards Breed, well known in public utilities circles, died on Oct. 14 in Roosevelt Hospital, New York City. Mr. Breed, who was born in Pittsburgh, came to New York twenty years ago at the age of 40. Although a prominent figure in the entire utility field he was affiliated more particularly with the light and power industry. He was a director of the American Light & Power Company, the Electric Light & Power Corporation, the Carolina Power & Light Company, the Wheeling Bank & Trust Company and many other concerns.

Adolphe Alfred Dion, president of the Moose Jaw Electric Railway, Moose Jaw, Sask., died recently in Ottawa. He was one of Canada's most prominent electrical engineers and was recognized as an authority on electrical development. Mr. Dion was 67 years old.

Paul E. Mercier, a member of the Montreal Tramways Commission, Montreal, Que., since April, 1926, died recently when making a survey for the St. Regis Paper Company. In 1895 he was engaged as chainman on the Montreal Park & Island Railway and in 1896 and 1897 was identified with the Canadian Pacific Railway in the Quebec district. He served in many other engineering capacities in Montreal and Quebec. Mr. Mercier was born 49 years ago in St. Hyacinthe, Que. He was educated in engineering at the Polytechnique School, Montreal.

Frank W. Remick, member of the banking house of Kidder, Peabody & Company, Boston, Mass., died on Oct. 16 at the Massachusetts General Hospital. Mr. Remick's business connections were extensive and diversified. In the street railway industry he was well represented, being a director of the Boston Elevated Railway, the Middlesex & Boston Street Railway, the Puget Sound Electric Railway and the Puget Sound Power & Light Company. Mr. Remick was born in Boston in 1861. He received his education in the Boston public schools. In 1879 he entered the employ of Kidder, Peabody & Company, and had been connected with the concern continuously since that date. He became a member of the firm in 1905.

Capt. David J. Kinzie, for the past several years safety engineer for the southwestern district of the Puget Sound Power & Light Company, Seattle, Wash., is dead. The captain was noted for carrying on in the Tacoma public schools the safety educational work sponsored by the Safety Council. Captain Kinzie was born in Boston. His early business career was spent in Alaska, where he had charge of personnel and safety work in several large mines. During the war he was located at Camp Lewis, where he was chief personnel adjutant. At the close of the war he joined the forces of the company, where he served until his death.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Baltimore to Have Interesting Tests on Pneumatic Car Wheels

A test set of pneumatic street car wheels has been prepared for the United Railways & Electric Company of Baltimore, Md., by the Hatfield Resilient Wheel Company, the J. G. Brill Company, the United States Rubber Company and the SKF Industries. One of these wheels was on exhibit in the J. G. Brill Company's space at the Cleveland convention. The theory of the wheel as worked out for application to railway usage is an adaptation of the Hatfield resilient wheel previously developed for truck and bus operation. Two pneumatic tubes are inserted into the circumference of the wheel to absorb all shocks and vibration before they reach the axle. These rubber pneumatic cushions are protected from all dirt, oil and heat by steel cover plates, the latter, however, allowing complete freedom of movement in a vertical direction.

The pneumatic tubes are bolted around their inner rim to the center steel section of the wheel and around their outer rim to the steel bearing surface which is applied to the rails. It is upon these bolted sections that the greatest strain will come in actual operation, due to braking, rapid acceleration, etc. If the pneumatic cushions are capable of withstanding the severe torque which will be applied to their rims the numerous advantages of the wheel will recommend it to widespread attention in the railway field. The test to be conducted in Baltimore will, therefore, be watched with considerable interest.

The air pressure in both tubes is equalized by dual connections from an air locking valve stem. The two tubes are placed side by side and are of equal cross-sections. The only metallic connection between the outside wheel surface and the inner wheel section is a ground connection of flexible wire.

Templeton, Kenly Company Stages a Prize Letter Contest

An opportunity to gain a little extra Christmas money has been offered to roadmasters, supervisors of track, their assistants and track foremen by the manufacturers of the Simplex jacks, in the way of a prize contest for letters telling about the use of Simplex tie-spacing shoes.

For ten letters that best describe and explain the different kinds of work done with the tie spacers, and which also tell how they were used and the results obtained, cash prizes from $100 to $10 will be awarded.

There are no special conditions to be followed. Letters may be written in pencil, ink or on a typewriter, and one contestant may write and submit as many letters as he wishes.

The contest closes Dec. 1 and the judges, who will be three maintenance of way engineers, will select the winners before Christmas. Details of the contest may be obtained from Templeton, Kenly & Company, Ltd., Chicago, Ill.

Widespread Use of Timken Bearings in Buses

An interesting point was brought out by the Timken Roller Bearing Company of Canton, Ohio, when a check-up by that company's representative indicated that of the 85 buses of 21 different makes displayed at the Cleveland convention of the American Electric Railway Association Timken bearings were included as regular equipment in every bus. The company states that this has also been true at other recent shows where buses have been exhibited. Efforts are now being made to bring about a widespread adoption of Timken bearings in electric railway cars, for both passenger and freight service.

F. H. Shepard Comments on Pennsylvania Railroad Order

Announcement was made in the issue of ELECTRIC RAILWAY JOURNAL for Oct. 9 of the large equipment order just placed with the Westinghouse Electric & Manufacturing Company by the Pennsylvania Railroad. It is considered to be of outstanding interest by railway and electrical equipment men because of its value in indicating the trend toward heavy traction electrification by the major railroad systems.

Commenting on this recent order, F. H. Shepard, director of heavy traction operation of the Westinghouse company, said:

> This commitment and the announcement of the plans for this important work by the Pennsylvania Railroad presages one of its most important activities since the war and indicates the time when New York will be linked to Philadelphia and Washington by electric service. The railroads have been making great strides in efficiency since their return from government operation, and traffic handling within the past month exceeded all previous records in America. And this with a freedom of movement and efficiency undreamed of during the dark days of the war and subsequent thereto.
>
> It is confidently believed that railroad conditions, as well as business generally, are reaching their normal stride and that the increment of growth may now be expected to follow year after year just as obtained before the war. This means provisions for increased capacity for traffic movement, and in many cases electrification to enable the increased service to be undertaken where physical restrictions make increased tracks and facilities impossible.
>
> It is well known that electrification will double the capacity over steam operation, and the last evidence of this is the example of the Virginian Railway, which completed the extension of its electrification to Roanoke, Va., last week. Here train operation under mountain grade conditions and for fast freight train service are demonstrating the maximum realized in the world today, 9,000-ton trains being hauled by a single locomotive at 28 miles an hour and mountain grade operation accomplished with 2,000 hp. per single train, more than double any performance accomplished by steam.

Chromium Corporation of America Has Been Formed

A company known as the Chromium Corporation of America has been organized to take over the patents of the chromium plating process developed by the Chemical Treatment Company and the Chromium Products Corporation, the latter a subsidiary of the Metal & Thermit Corporation. This new company will have plants and branch offices in most of the leading industrial centers.

John T. Pratt, president of the Chemical Treatment Company, will continue in that office and also be chairman of the board of the new corporation, of which Dr. F. H. Hirschland will be president. The latter is also president of the Metal & Thermit Corporation. Vice-presidents in charge of operations will be Louis C. Owens, Jr., Dr. Erich A. Beck, and Richard Loengard. In addition to the above officers, the directors will consist of a prominent and financially strong group of men.

In announcing the formation of the new corporation, Mr. Pratt made the following statement:

> Manufacturers of metal products have followed with the greatest interest the rapid development of chromium plating during the past few years. Knowing the properties of chromium, particularly its extreme hardness and ability to resist acids, high temperatures and all sources of tarnish, corrosion or discoloration, they have felt that it would only be a matter of time before chromium plate would become a standard finish for many types of metal products.
>
> The new corporation will take over and operate the Chromium Products plant in Jersey City and the Chemical Treatment plants in New York and Waterbury. Plans are also being formulated for the opening of new plants at Carteret, N. J.; East Chicago, Ind., and South San Francisco, Cal., in each of which the Metal & Thermit Corporation now has plants, as well as in Chicago, Detroit, Cincinnati, Akron, Philadelphia, Pittsburgh and Cleveland. The company's expansion program contemplates a national service within two to three years.
>
> Having taken over from the Chemical Treatment Company its trade name, "Crodon," which will hereafter stand for chrome plate as applied by the Chromium Corporation of America or its licensees, the company will inaugurate immediately an intensified selling, merchandising and engineering campaign which will cover manufacturers of certain types of metal products throughout the country. The Chemical Treatment Company policy of limiting the use of Crodon to manufacturers of quality products will be rigidly adhered to. At the same time, the educational advertising, designed to inform manufacturers, the trade and the public of the many advantages of Crodon will be intensified.

Credit Where Credit Is Due

The Cutter Company, Philadelphia, Pa., appreciates its employees. Furthermore, it does not hesitate to express that appreciation in some tangible way. Recently the company published a handsome little volume entitled "Experience Is Master." In this book are pages and pages of pictures and interesting little sketches of the many members of the Cutter organization who have helped to build up the company's prestige as a manufacturer of circuit breakers and other electrical protective devices since 1888.

Only men who have served the Cutter organization for ten years or more are introduced to the readers of the book. But there are many of these, and in looking over the various sketches it is possible to obtain a very good idea of the spirit which imbues all of the members of the Cutter organization.

Comfort Features Are Provided in New Ruggles Bus

Service on long interurban runs and special tours has been particularly considered by the Ruggles Motor Truck Company of Saginaw, Mich., in designing its new 26-passenger touring coach, which has just been placed on the market. Heretofore one of the drawbacks in using motor buses for long-distance runs has been the lack of comfort facilities for the passengers. The Ruggles company has attacked this problem by installing complete lavatory and toilet facilities in its bus.

The body is mounted on the standard Ruggles model 70 coach chassis, with a 236-in. wheelbase, powered with a 105-hp., six-cylinder motor, with double reduction drive. The bus is equipped with 34x36-in. pneumatic cord tires, with dual rear tires on Budd steel disk wheels. Gruss transport type air springs are used on the front.

Sufficient headroom has been provided in the interior arrangement of the bus to allow the average person to walk through the aisle without stooping. Pullman seats with arms and special backs have been installed. These are covered with a high grade of striped mohair. The window sashes are of brass construction, Pullman type, with maximum openings. The floor is covered with battleship linoleum and over this covering, in the aisle, is Wilton carpet. Pillar mirrors are installed between the windows, together with double coat hooks and combination ticket holders. All dome lights are protected with non-glare shields. Over the rear wheel housings are built side seats with ample space between the seats for a portable lunch or card table. An electric buzzer system, electric clock and adjustable driver's seat are other standard equipment featured.

Running the entire length of each side of the interior and above the seats of this bus are individual luggage racks. They are nickel-plated and placed high enough to be out of the passenger's way, yet easily accessible for handling small baggage parcels and heavy wraps and small grips. Space is provided on the roof for taking care of large luggage requirements.

Comfort Is Carried to the Point of Luxury in the Interior Fittings

The lavatory is situated in the right rear side of the bus and is finished in mahogany paneling. It is economical in the space it consumes and is built under strictly sanitary conditions. The lavatory includes toilet, ice water tank, large mirror or heavy plate glass and a porcelain wash bowl with running water. The installation of this lavatory relieves the necessity of providing the necessary long rest period which has heretofore been given in long distance operation.

The new bus was on display at the American Electric Railway Association convention which was held in Cleveland, Ohio, Oct. 4 to 8. Visitors at the convention were given an opportunity to inspect every new detail of its construction.

New Ruggles Coach Which Was on Display at the American Electric Railway Association Convention in Cleveland

Fifth National Power Show to Be Held

The Grand Central Palace in New York City will be the scene of the Fifth National Exposition of Power and Mechanical Engineering, to be held from Monday, Dec. 6, through Saturday, Dec. 11. On exhibition there will be heat and power generating apparatus, hoisting and conveying equipment, power transmission equipment, machine tools, refrigerating machinery and heating and ventilating machinery.

In addition an elaborate program of the latest films showing engineering and industrial progress will be displayed.

The fifth exposition will include exhibits of 500 manufacturers and will occupy four floors in the Grand Central Palace, the largest exposition of its kind ever held in this country. The American Society of Mechanical Engineers will hold its annual meeting in the Engineering Societies Building on dates included by those of the Power Show, as will also the American Society of Refrigerating Engineers.

Electric Locomotives for Rack Railroads

Several electric locomotives of a new type, intended for use on rack railroads, are at present in course of construction at the works of the Brown-Boveri Company in Mannheim, Germany. A number of these are intended for service on a section of the Andes railroad, operated by the Chilean Transandine Railway. The engines for this line weigh 85 tons and are fitted with six motors, each capable of developing 235 kw. for one hour, with a continuous output of 195 kw. These units will operate on 3,000 volts d.c. With a total hourly capacity of about 1,400 kw., these locomotives are claimed to be the most powerful of their kind so far constructed.

The remainder of the locomotives now being built are intended for service on the Asui Pass in Japan. The section includes a ramp about 600 yd. in length with a gradient of 6.7 per cent. Direct current at 600 volts is supplied by means of a third rail system. The engines are equipped with three motors having a one hour capacity of 200 kw. and a continuous capacity of 160 kw.

Work is being rapidly pushed on all of these units with a view to delivery in the near future.

Electric Railway Orders for Haskelite and Plymetl

In the recent issue of "The Lightweight Champions' Record," published by the Haskelite Manufacturing Corporation, Chicago, Ill., the following orders for Haskelite and Plymetl received from electric railway companies were listed:

Rochester & Syracuse Railroad—Plymetl to replace steel on a 45-ton interurban car.

Indianapolis Street Railway—Haskelite for headlinings of twelve cars.

Houston Electric Company—Plymetl for side panels.

West Penn Railroad — Plymetl for side panels in rebuilt cars.

Chicago, Milwaukee & St. Paul Railroad—Haskelite for interior trim in five gas-electric cars.

Twin City Motor Bus Company—Plymetl for side panels.

Peoples Motor Bus Company—Haskelite for roofs and headlinings in 25 double-deck buses.

Every One Has a Good Word for Cleveland Exhibit

Manufacturers Were Not Loath to Demonstrate Their Faith in the Industry by Making Possible the Largest Display Ever Staged—Total Registration 8,623; Total Indoor Space Sold 119,007 Sq.Ft.

AND still the figures go up. This year there were 119,007 sq.ft. of exhibit space sold at the Cleveland convention of the American Electric Railway Association. Oddly enough, the total amount of space available for exhibits came to the same total of 119,007 sq.ft. Nor was there any lack of manufacturers, who, like the famed virgins of Hebraic times, had failed to safeguard themselves by making advance preparations, and found at the last moment that the doors were shut to them. As a result of this year's work the crown of Fred Dell, director of exhibits, might be said to bear many jewels. Brightest of these is the sparkling record of 41 street cars and other rolling stock which was placed on exhibit. Twenty-six were for passenger service and the remainder consisted of freight and service equipment.

The best that had ever been mustered in previous exhibits was 11 cars. And yet in the first half of this year the purchases of rolling stock had reached a low ebb. It seems that the manufacturers have set up against this a high tide of enthusiasm, for no cost was spared in preparing the exhibits at Cleveland.

REGISTRATION SETS NEW RECORD

This year the total registration at the convention was 8,623 and the total number of manufacturer members listed was 423. Both of these figures surpass by large margins any records which have been set up in the past. A comparison of these various totals for the past six years might be interesting:

Year	Where Held	Registration	Sq.Ft. of Space Sold	No. of Mfg. Co.
1921	Atlantic City	1,189	No exhibit	225
1922	Chicago	4,200	61,895	244
1923	Atlantic City	4,404	75,681	274
1924	Atlantic City	5,804	86,349	330
1925	Atlantic City	7,147	100,030	371
1926	Cleveland	8,623	119,007	423

Naturally it was impossible, with the tremendous amount of material on display, to consolidate all of the exhibits on one floor, or even in a single building. But the co-operation of the city authorities in Cleveland made it possible to have available a supplementary building, known as the West Wing, by the time the exhibits began to arrive. Most of the bus and bus equipment manufacturers were assigned space in this wing but there were also many trackwork, steel castings, and similar displays there. Then there was the regular exhibit hall downstairs in the auditorium building, which housed most of the balance of the indoor exhibits. There were a few large booths on the arena floor proper.

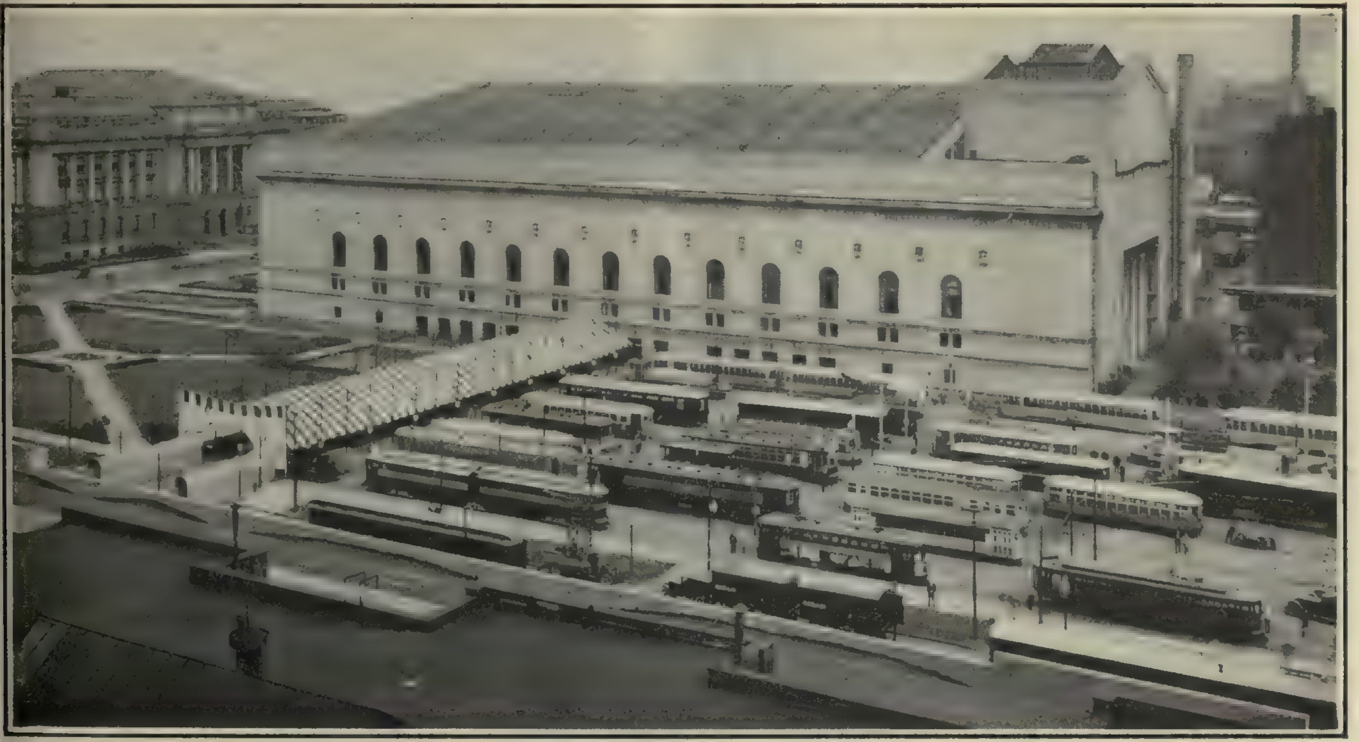
Much to the satisfaction of the exhibitors the crowds circulated very well during the several days of the convention and the fears which had been expressed by some that they would be overlooked due to their locations in the west wing or in the downstairs exhibit proved ill founded. Mr. Dell sent out a questionnaire to the various exhibitors recently to get the reaction of each company to the convention as a whole and to the general arrangements and handling of the exhibit. Replies from these sources have been most enthusiastic. Exhibitors were particularly impressed with the excellent facilities which Cleveland had available for handling shipments of display material and for setting up and generally facilitating the progress of the show.

It has been said before that one of the most outstanding features of the whole exhibit was the generous display of rolling stock, both passenger cars and freight and service equipment. It does no harm to emphasize this point by occasional repetition. The cars were not only conspicuous by their numbers; they indicated such strides forward in appearance, comfort, reduction in weight, and in general operating efficiency that they could not but prove of monumental inspiration to the railway men there assembled.

MANY UNEXPECTED LINES REPRESENTED

But the many other features of the exhibit were not without their own significance. When one stepped into the west wing he was literally dazzled by the display of buses—bodies, chassis and complete units. Certainly the last word in the artistic as well as in sturdy dependability was very much in evidence there.

Almost every conceivable line of railway supplies was represented in the Cleveland show. And there was a surprising array of materials which would not, at first glance, strike one as being subject to great demand in this industry. All of which goes to prove that the electric railway field is being looked upon with increasing favor by manufacturers in general as one worthy of thorough exploitation and development as a major channel for marketing goods.



Even the Rain Could Not Keep the Crowds from Inspecting the Car Exhibits

Rolling Stock

Boston Elevated Railway, Boston, Mass., has purchased eight 29-passenger city type Mack buses. Two of these units will be used between Allston and Cambridge and the remaining six are classed as "extras."

Honolulu Rapid Transit Company, Honolulu, Hawaii, is asking for tentative bids and preliminary specifications for twelve additional cars. This will bring the total of cars owned up to 83.

Los Angeles Railway, Los Angeles, Cal., received six new buses from the Fageol Motor Company of Oakland, Cal. during the month of August. Among these were included one four-cylinder street car type bus, four six-cylinder street car type buses and one double-deck bus. All but the four-cylinder unit were equipped with air brakes.

Hamilton Street Railway Company, Hamilton, Ont., Canada, is preparing to order 24 new double-truck street cars, according to an announcement recently made by the Dominion Power & Transmission Company.

Chicago & Northwestern Railroad, Chicago, Ill., has placed an order for five 72-ft. gas-electric rail cars with the Electro-Motive Company. These units will be practically identical with the three cars which were delivered to the railroad in May. They will have seats for 42 passengers, and in addition each will have a 15-ft. railway post office and a 16-ft. 8-in. baggage compartment.

Maryland & Pennsylvania Railroad, Baltimore, Md., has ordered one 72-ft. gas-electric rail car for all-passenger service from the Electro-Motive Car Company. This car will be equipped with a model No. 120 power plant.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has purchased one six-cylinder parlor-car type Fageol bus equipped with Westinghouse air brakes for use in suburban service out of Milwaukee.

Track and Line

Virginia Electric & Power Company, Richmond, Va., is making rapid progress on the extension of its Norfolk trolley line to Port Norfolk and Pinners Point and expects to have the improved service in operation early in October. A part of the old line is being double-tracked and a single-track extension for some distance is being laid. Total new trackage is around 15,000 ft. The company will improve its High Street lines, laying 12,200 ft. of new trackage.

Los Angeles Railway Corporation, Los Angeles, Cal., has applied to the Railroad Commission for permission to construct a double track in Leonis Boulevard between Pacific Boulevard and Downey Road in the city of Vernon.

Pacific Railway, San Jose, Costa Rica, will be electrified, according to a recently approved contract between the government of Costa Rica and the Allgemeine Elektricitäts-Gesellschaft of Berlin. The electrified portion of the railway will extend from San Jose to Punta Arenas, the Pacific port.

Honolulu Rapid Transit Company, Honolulu, Hawaii, was given authority by the Public Utilities Commission to spend $31,124 in double-tracking Punahou Street from Wilder Avenue to below Dominis Street.

Gary Railways, Gary, Ind., has started laying a second track on its Hammond line in Eleventh Avenue, Gary, for a distance of ½ mile between the Pennsylvania Railroad crossing and Rutledge Road. The work will be completed in about two weeks. At the request of residents along Eleventh Avenue the company has willingly agreed to remove its poles from the center of the street and to erect poles near the curb line from which the trolley wires will be suspended. The cost of the entire undertaking, including the realignment of poles, is estimated at $25,000.

Trade Notes

American Brown Boveri Electric Corporation, Camden, N. J., announces that four district offices of the company have now been established. These are located at 165 Broadway, New York City; 842 Summer Street, Boston, Mass.; 922 Witherspoon Building, Philadelphia, Pa., and 230 S. Clark Street, Chicago, Ill.

American Steel & Wire Company, Chicago, Ill., has announced that the scope of its Birmingham, Ala., office will be enlarged to cover all of the products manufactured by the company. J. J. Gilmore has been promoted to be manager of sales in the Birmingham district, covering Alabama, Mississippi and Louisiana.

J. H. Bunnell & Company, Inc., New York, N. Y., announced the removal of its factory location to new and larger quarters at Pearl and Prospect Streets, Brooklyn, N. Y. The main office and warehouse will continues to be located at 32 Park Place, New York City.

New Advertising Literature

Martindale Electric Company, Cleveland, Ohio, has issued its most recent catalog on commutator, slotting and grinding equipment and various motor maintenance specialties. This is catalog No. 7.

J. G. Brill Company, Philadelphia, Pa., has issued a leaflet describing the Brill 177-E truck for light-weight cars. Detailed information on the various component parts of the truck is given. Dimensions for the Brill 177-EX, 177-E1X and 177-E1 trucks are included.

Wright Manufacturing Company, Lisbon, Ohio, has published a new catalog, No. 11, which is said to be one of the most comprehensive handbooks on chain hoists, trolleys, hand cranes and allied equipment ever prepared. It contains not only cuts and general descriptive matter but also line drawings giving all dimensions and clearances of the various products.

American Brown Boveri Electric Corporation, New York, N. Y., has published descriptive circular No. 200 on turbo-compressors and blowers. Compressors and blowers for various industrial applications are listed.

ELECTRIC RAILWAY MATERIAL PRICES—Oct. 19, 1926

Metals—New York

Copper, electrolytic, cents per lb.	14.15
Lead, cents per lb.	8.35
Nickel, cents per lb.	35.00
Zinc, cents per lb.	7.68
Tin, Straits, cents per lb.	70.50
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	63.00
General service	32.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$6.50
Somerset mine run, Boston	2.20
Pittsburgh mine run, Pittsburgh	2.225
Franklin, Ill., screenings, Chicago	1.525
Central, Ill., screenings, Chicago	1.45
Kansas screenings, Kansas City	2.35

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.30
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.20
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.65
Sheet iron (24 gage), cents per lb.	3.00
Sheet iron, galvanized (24 gage), cents per lb.	3.85
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	12–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–17.50
Colored	10–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	11.2
White lead in oil (100 lb. keg), cents per lb.	15.25
Turpentine (bbl. lots), per gal.	$0.90
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	5.25–5.50

* Prices f.o.b. works, boxing charges extra.

Wire—New York

Copper wire, cents per lb.	16.25
Rubber-covered wire, No. 14, per 1,000 ft.	$5.75
Weatherproof wire base, cents per lb.	17.75

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$147
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4 N.Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.94
Cement, Chicago consumers' net prices, without bags	2.10
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

eavy copper, cents per lb.	11.50
Light copper, cents per lb.	9.75
Heavy brass, cents per lb.	7.25
Zinc, old scrap, cents per lb.	4.25
Lead, cents per lb. (heavy)	6.875
Steel car axles, Chicago, net ton	$17.25
Cast iron car wheels, Chicago, gross ton	14.75
Rails (short), Chicago, gross ton	16.75
Rails, (relaying), Chicago, gross ton	28.50
Machine turnings, Chicago, gross ton	6.50

PEACOCK STAFFLESS BRAKES

Are Dependable Brakes

With a braking power three times that of the ordinary hand-brake, and almost unlimited chain-winding capacity, Peacock Staffless Brakes are a guarantee of safety when emergency stops are necessary.

No matter what condition of brake rigging exists, any length of brake-chain can be handled by Peacock Brakes. Even up to 12 feet if necessary.

Will your hand brakes do this? Or will they jam after taking a few turns on the brake drum. Peacock Staffless Brakes wind chain over the drum, and drop it in the capacious housing below.

Modern cars are equipped with Peacock Staffless Brakes because of minimum platform space occupation, simplicity of operation and low installation and maintenance costs.

National Brake Company

890 Ellicott Square Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Co., Ltd., Montreal, Can.

Make this trial:

Let us send you a Peacock Staffless Brake to test. Try it out in fair competition with any other brakes. Slack off the brake until full piston travel is required to set brake; release air brakes; then try to set hand brake. Will it hold?

Real Power Brakes

What they are and what they will do for you.

True power brakes—air brakes of the correct design—are complete braking units in themselves and are not simply conventional mechanical brakes operated by power.

Only by completely eliminating from the service brake the elements which are the *cause* of their unreliability and troublesome habits can they be made reliable in operation and, by present standards, more nearly trouble-free than any other operating part of the vehicle. To the operator this holds forth the promise of important reductions in the cost-per-mile of operation, and there is nothing, unless it be traffic, that is more vital to profits than cost-per-mile.

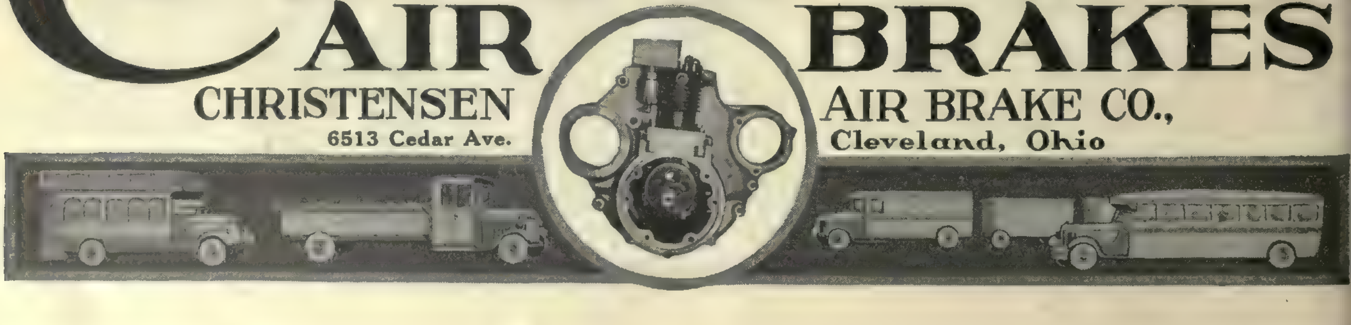
Christensen Air Brakes are Real Power Brakes. They are not a compromise or an accessory. They must be built into the chassis, but once installed are without equal for effective control and low cost of maintenance.

Power is applied to the brake shoes by pistons operating in cylinders inside the brake drums. The thrust of these pistons is transmitted directly to the ends of the brake shoes by powerful levers interposed between the piston stems and the ends of the shoes. Sealtite all-metal pistons are used in the brake cylinders—impervious to oil and brake heat—and the piston travel is sufficient to wear out the liners. In addition, Christensen Brakes are, by the very nature of their design, inherently self-equalizing. Hence, no adjustments are required from the time the brakes are originally set up until the liners are completely worn out. All outside service brake rigging—cams, pull-rods, cables, levers, and mechanical equalizers—is eliminated.

Real Power Brakes—Christensen Air Brakes—will reduce your brake maintenance cost, increase the life of your brake liners, reduce your accident hazard, enable you to make faster schedules with safety, make your drivers better and more alert by reducing braking fatigue, and promote public confidence. Figure it out yourself. It is expensive to be without them.

When you buy buses specify definitely "Christensen Air Brakes" — the Real Power Brake.

Christensen
AIR BRAKES



CHRISTENSEN AIR BRAKE CO.,
6513 Cedar Ave. Cleveland, Ohio

a.c.f.
Hall-Scott

The Most Modern Motor Coach

Because of their unusual record for satisfactory and profitable operation, the Fageol Safety Coach and the Hall-Scott Engine were chosen by the American Car and Foundry Company as the automotive units with which it placed itself in position to supply equipment in the highway transportation field.

As a further step in this same direction, we introduced at the American Electric Railway Association Convention this month, an entirely new coach—the A. C. F. This coach is designed for heavy duty service, has stronger frame and structure, four-wheel brakes, and ample springs, making it adaptable to the severest conditions of overload and speed imposed by mass transportation requirements.

American Car and Foundry Motors Company
30 Church St., New York

Budd-Michelin Dual Wheels . . . first aid to better buses and better profits

◆

EARLY venturers in the bus industry saw that if buses were faster, more comfortable to ride in, more people would ride in them.

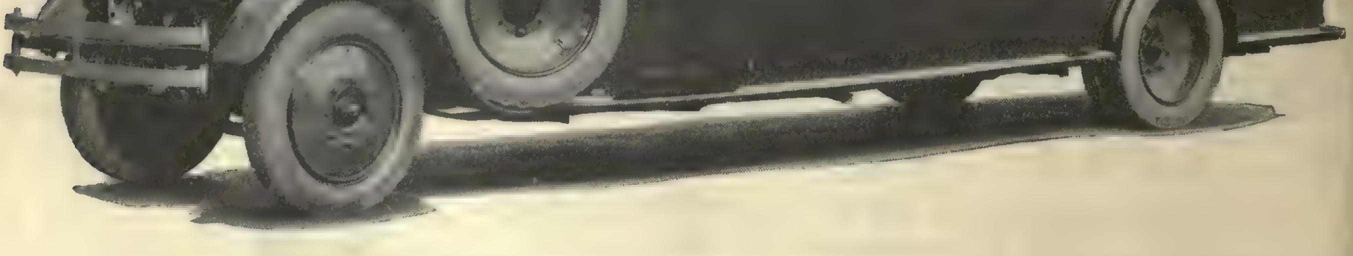
They realized that this meant putting their heavy buses on pneumatics—that was the problem.

There was one wheel that could solve it. A wheel that had proved its stamina on the war-torn roads of France—that had triumphed under tests where other wheels had perished—the Budd-Michelin Dual Wheel.

Bus owners adopted it. It brought speed, passenger comfort—and more. It gave the heavy bus low body suspension with greater seating capacity. It cut servicing costs by making one-size wheels and tires standard throughout the fleet. And it boosted tire-mileage—made it possible for heavy buses to get from 15,000 to 20,000 miles from a set of pneumatics.

Veteran bus owners have never been wooed away from Budd-Michelin Duals. Over 40,000 buses are equipped with them—and this fact alone is a safe guide to follow.

BUDD
WHEEL COMPANY
Detroit

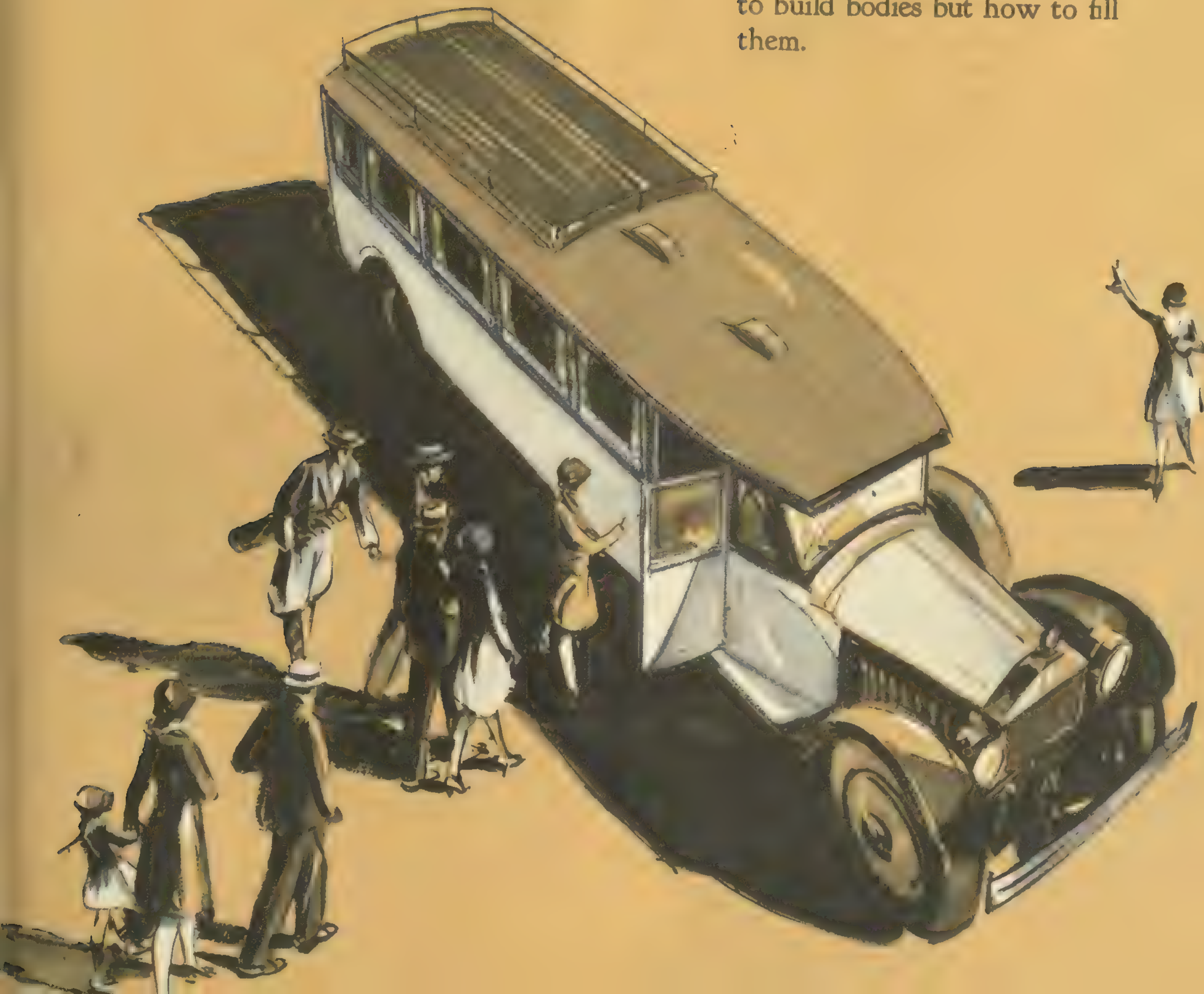


The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units). All wheels completely interchangeable either as units or as halves of Duals. One spare.

The Attractive Body draws *everybody*

Into every detail of a Lang Body is built an invitation to ride, a carefully studied program for attracting passengers that draws them off the curb—

For Lang not only knows how to build bodies but how to fill them.



LANG BODIES

create new passengers

There is a personal touch of luxury about Lang Bodies that wins the passenger, indicating a characteristic of Lang body-building that dates back to the days when Lang built fine carriages and coaches for private use.

THE LANG BODY COMPANY
CLEVELAND, OHIO

*"After all—
it's the Setting
that counts!"*

Are You Going to "Carry On" from Cleveland?

EVERYONE agreed at Cleveland that electric railway service can and should be vigorously *sold*. Public relations work was an outstanding topic of discussion and many operators made up their minds to see what could be done for their own properties in this connection.

Convention enthusiasm, however, is apt to wane when once we are back in harness. Are you one of those who are really going to "carry on" from Cleveland?

We announced, at this convention, our readiness to undertake productive public relations work for the electric railways. We discussed our experience in advertising *to* the railways, our connection with railway organizations and associations, our familiarity with railway problems, our association with men prominent in the public relations field and the clearing house we have established for exchange of public relations experience.

A number of well-known properties are now consulting us in this respect and, if you too are interested in the active selling of your service, we hope you will not hesitate to get in touch with us.

As a first step—if you did not pick one up in Cleveland—we suggest that you obtain a copy of our booklet "Selling Transportation." This booklet outlines our ideas upon the subject and explains just how we work. We do not, for instance, handle merely the advertising end of these activities, but enter into every phase of public relations work, including the training and establishment of an efficient sales department in your own organization. Write to let us know that you are interested and we will be glad to mail a copy of this booklet with our compliments.

Doyle, Kitchen & McCormick, Inc.
2 WEST 45th STREET, NEW YORK

Does Your Grocer Use Scales?

HE DOES!—Because you expect him to weigh your orders of bulk goods. If he didn't you would assuredly change your trading place.

The same thing is true with circulation. During the last few years Advertisers have not been satisfied to *suppose* they were getting a certain circulation for their money; they don't want to be merely *told,* they want to *know.*

They want the circulation measured by a standardized and unquestionable measurement.

The *Audit Bureau of Circulations* is the recognized authority for proving circulation. It is maintained as a co-operative organization by the advertisers, advertising agencies and publishers who realize the necessity for businesslike methods in advertising.

A. B. C. reports place in the hands of advertisers, essential facts that have been secured and verified by a searching examination of the publisher's records.

You don't need to buy Space by Guess!

You can get the full circulation facts on Electric Railway Journal by referring to the last A. B. C. report which will be gladly furnished on request.

Street Railway History Repeats Itself With

GRAHAM BROTHERS MOTOR COACHES

Excessive costs, a few years ago, checked the tendency towards larger and heavier street cars. Engineers strove for less weight, better distribution of it. Then figures confirmed the efficiency of the lighter, smaller street car.

History repeats. The tendency in motor coaches has gone through the same stages—but much more rapidly.

More and more street railways are putting into service Graham Brothers 21-Passenger Street Car Type Motor Coaches.

They best fit the all-day load requirements. Their initial cost is low. Operating and maintenance costs are low. The coach is so attractive in appearance it invites patronage—so comfortable and dependable it wins preference over private automobiles.

Your Dodge Brothers dealer will give you any information about Graham Brothers Motor Coaches.

Street Car Type

$3815

f. o. b. Detroit

Complete With Body to Seat 21 Passengers

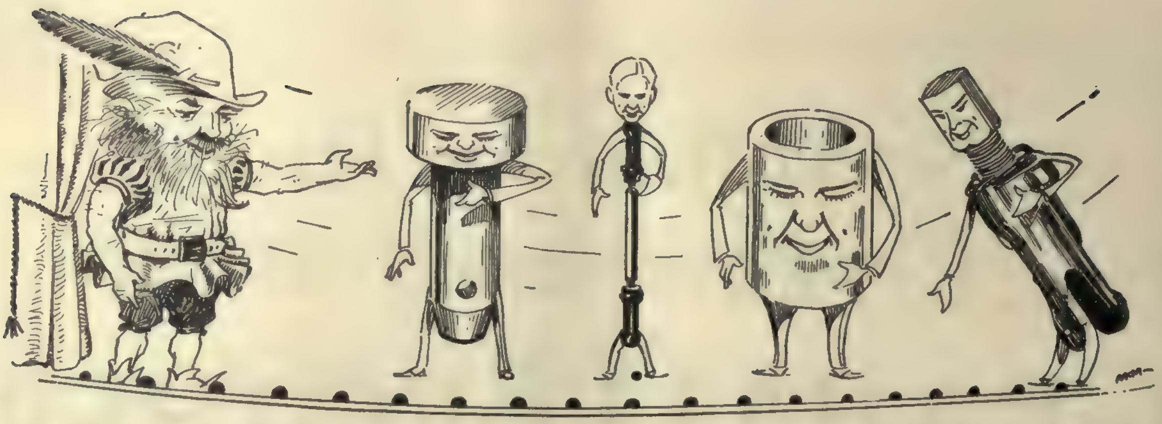
Parlor Coach

$3750

f. o. b. Detroit

Complete With Body to Seat 12 Passengers

GRAHAM BROTHERS
Evansville — DETROIT — Stockton
A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED—TORONTO, ONTARIO



Judge them by the encores—

Encores to the actor are what repeat orders are to a car part. For this is the tangible means of judging their popularity and ability.

Judged on the basis of repeat orders Boyerized Parts are popular products in the electric railway industry. Such success can be easily traced to the fact that the Boyerized Process enables Boyerized Parts to outlast ordinary steel parts three to four times.

Pick out the parts you need—then send for quotations.

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings

Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings

The
McArthur
Turnbuckle

Bemis Car Truck Company

Electric Railway Supplies

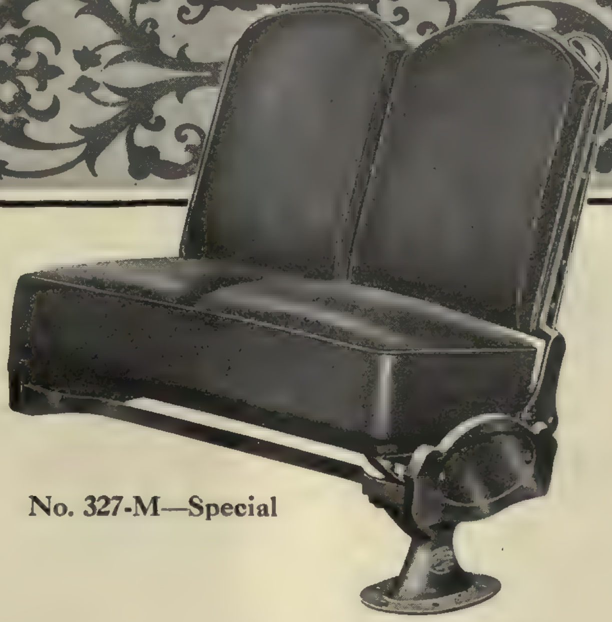
Springfield, Mass.

Representatives:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
L. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

100 · YEARS · OF · MANUFACTURING · EXPERIENCE

Cane
Webbing
for Car Seats



No. 327-M—Special

Greater Comfort in This H-W Interurban Seat

Closer placement in cars and greater passenger comfort with increased leg room are outstanding features of this Heywood-Wakefield interurban car seat model. Mechanism rails are set in. The deep double spring cushions have chamferred edges. Individual backs are specially shaped and pitched to meet the best ideas of comfort without sacrifice of car room.

It is one of a series of new H-W Electric Car seat models equally suitable for either new cars or replacements.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W Sales Office.

Heywood-Wakefield
REG. U.S. PAT. OFF.

HEYWOOD-WAKEFIELD SALES OFFICES
Heywood-Wakefield Company, Wakefield, Mass.

Heywood-Wakefield Company,
516 West 34th St., New York, N. Y.

Herbert G. Cook,
Hobart Bldg., San Francisco, Cal.

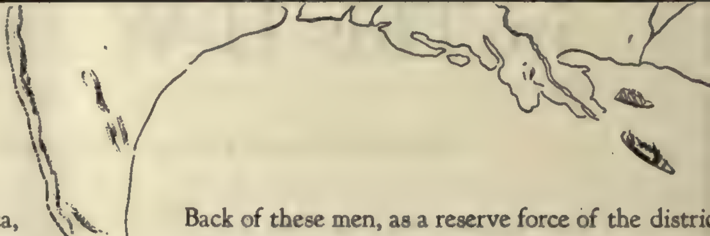
The G. F. Cotter Supply Co.,
Houston, Texas

Heywood-Wakefield Company,
439 Railway Exchange Bldg., Chicago, Ill.

Frank N. Grigg,
630 Louisiana Ave., Washington, D. C.

Railway & Power Engineering Corporation,
133 Eastern Ave., Toronto;
Montreal; Winnipeg, Canada

Knowledge of Industr



In the heart of the industrial centers of America, the McGraw-Hill Publishing Company has placed its district offices—that manufacturers may have available quickly and conveniently the McGraw-Hill service, data and knowledge of industry.

Every manufacturer who would sell industry more efficiently is now almost in the shadow of a McGraw-Hill office. Right at his elbow is the identical knowledge of industry and industrial marketing which has proved of such value to manufacturers who have availed themselves of it.

Each office is in charge of a district manager, who, through previous experience in industry or long service with McGraw-Hill, is well qualified to counsel with manufacturers on methods of selling to industry. His staff includes Marketing and Advertising men who have been drawn from industry, and whose contacts with industry are kept fresh by constant work on industrial selling problems.

Back of these men, as a reserve force of the distric office, are the entire McGraw-Hill editorial, circulation, marketing and advertising staffs. Manufacturers consulting these district offices are thus assure all of the McGraw-Hill resources in applying the McGraw-Hill Four Principles of Industrial Marketing to their ow selling.

These Four Principles are fundamental to waste-fre selling. Briefly stated they are: (1) Determination c Markets; (2) Their Buying Habits; (3) Their Channe of Approach; (4) Appeals that Influence.

While each manufacturer is best able to apply thes Four Principles for himself, the McGraw-Hill Publishin Company can be of material assistance in counseling wit manufacturers and in either supplying data or suggestin how it may be obtained. This service is gladly fu nished and we welcome the opportunity to serv manufacturers and their advertising agents in the inte est of more effective marketing. A conference may b arranged, either in your office or a McGraw-Hill office.

Union Trust Co. Building Chicago
Guardian Building Cleveland
McGraw-Hill Building New York
Murray Hill Building New York
Insurance Co. of No. Amer. Bldg. Philadelphia

The McGraw-Hill publishing headquarters in New York has been augmented by a district sales office as illustrated, to serve more conveniently eastern manufacturers and their advertising agents.

rought to Industry's Door

McGraw-Hill's District Office Facilities—

105 advertising salesmen, whose first function is to advise on marketing problems, serve industry and trade through McGraw-Hill district offices.

36 seasoned advertising planners and writers and 20 artists, all trained in the appeals and mechanics of industrial advertising, supplement the district offices' marketing staffs.

These men and 108 McGraw-Hill editors have a background of practical experience in selling or production in 58 broad classifications of industry.

All data relating to production, marketing and buying practices developed by any district office will be made available by any other district office.

McGraw-Hill has its own telegraphic facilities in New York headquarters for expediting contact with district offices and industry.

This district office set-up is in conformity with the McGraw-Hill Four Principles of Industrial Marketing which stipulate "selling in terms of the prospect's problems."

GRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON

cGRAW-HILL PUBLICATIONS

45,000 Advertising Pages used Annually by 3,000 manufacturers to help Industry buy more effectively.

NSTRUCTION & CIVIL ENGINEERING
ENGINEERING NEWS-RECORD
SUCCESSFUL METHODS

ELECTRICAL
CTRICAL WORLD JOURNAL OF ELECTRICITY
ELECTRICAL MERCHANDISING

INDUSTRIAL
RICAN MACHINIST INDUSTRIAL ENGINEER
EMICAL & METALLURGICAL ENGINEERING
POWER

MINING
ENGINEERING & MINING JOURNAL
COAL AGE

TRANSPORTATION
ELECTRIC RAILWAY JOURNAL
BUS TRANSPORTATION

OVERSEAS
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(European Edition)

RADIO
RADIO RETAILING

CATALOGS & DIRECTORIES
ELECTRICAL TRADE CATALOG
ELECTRICAL ENGINEERING CATALOG
RADIO TRADE CATALOG
KEYSTONE CATALOG *(Coal Edition)* KEYSTONE CATALOG *(Metal-Quarry Edition)*
COAL CATALOG CENTRAL STATION DIRECTORY
ELECTRIC RAILWAY DIRECTORY
COAL FIELD DIRECTORY
ANALYSIS OF METALLIC AND NON-METALLIC MINING, QUARRYING AND CEMENT INDUSTRIES

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

Chicago & Alton Waukesha Engined Versare-Westinghouse Bus and Chicago & Alton R. R. Deluxe Lincoln Limited

An Epoch Arrives

The Covered Wagon, the Iron Horse and the Electric Locomotive each have had their day. With the development of a suitable gasoline engine that can handle this 72-passenger, 30,000 pound (when loaded), eight wheel bus at fifty miles an hour, there comes a new era in transportation. Waukesha "Ricardo Head" six cylinders are the only standard production engines suitable for a high speed gas-electric bus of this speed and weight.

Write for information regarding these heavy duty vibrationless six cylinder engines, made in sizes varying from 70 H. P. for a high speed light bus or speed truck up to the 125 H. P. model used in the above C. & A. R. R. Versare-Westinghouse bus.

AUTOMOTIVE EQUIPMENT DIVISION

WAUKESHA MOTOR COMPANY

Waukesha Wisconsin

Eastern Sales Office Aeolian Building, 33 W. 42nd Street New York City

Builders of Heavy Duty Engines for Over Twenty Years

Texas Operator Buys 5

This photograph shows four of Mr. Nunnelee's fleet of 19 Studebakers. It is impossible to assemble the entire fleet as they are constantly on the road, earning dividends for the owner.

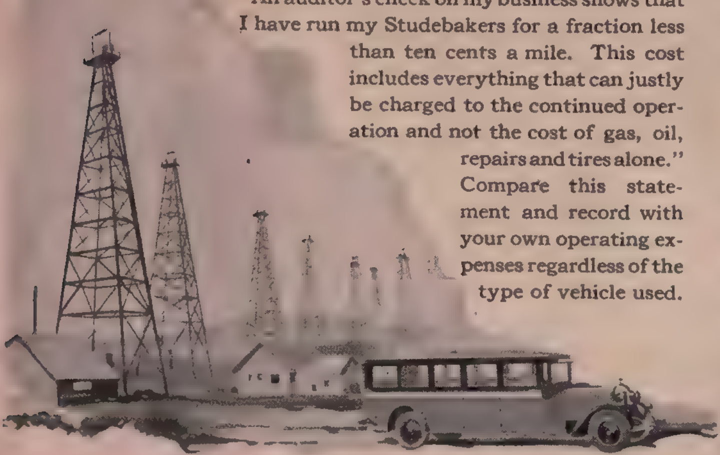
Cost Records of W. E. Nunnelee, Tyler, Texas, show marked saving in Studebaker operating cost—so he buys five additional Studebaker busses, bringing his Studebaker fleet to 19 units

WHEN W. E. Nunnelee, who has been in the bus business since 1921, needed more equipment to meet the growing demand for better transportation in the vicinity of Tyler, Texas, he had a certain definite method of selecting new equipment. At various times he had tried out many other types of equipment. So his cost records were complete. Therefore he referred to his own ledger which pointed out the logical choice—STUDEBAKER! Accordingly on July 24th he placed an order for five new Studebaker busses, bringing his fleet to a total of 19 Studebaker units.

It is not the offhand statement of an owner or his mere opinion that proves the relative value of a motor bus. It is what the cost record has to say that really counts.

Complete Cost Less Than Ten Cents a Mile

Convincing evidence of Studebaker economy is given in Mr. Nunnelee's statement: "An auditor's check on my business shows that I have run my Studebakers for a fraction less than ten cents a mile. This cost includes everything that can justly be charged to the continued operation and not the cost of gas, oil, repairs and tires alone." Compare this statement and record with your own operating expenses regardless of the type of vehicle used.



It would be difficult to find a more strenuous test for any automotiv unit. Here severe climate conditions and the punishment of road some good, others bad, conspire to make overland travel difficult.

But Mr. Nunnelee's experience, which is typical of hundreds others, indicates Studebaker stamina and economy—for he also say "One of the main reasons to which I attribute my success is the fa that I have standardized on Studebakers.

"On September 8, 1922, we made our first run to Marshall, Texa and since that time have never missed our schedule. At present w are operating six passenger lines out of Tyler, embracing a territory nearly 300 square miles. On an average we cover over 2,300 miles daily Several of our Studebaker busses have from 100,000 to 200,000 miles t their credit and are yet in excellent condition. After my experience wit several other cars, *I find that I can run a Studebaker from on to five cents a mile cheaper than any of the other makes."*

The real basic reasons why Studebaker busses lead the field in aut motive transportation are found in the ledgers of owners everywher Over 2,000 Studebaker busses, in constant daily service in every sectio of the United States and in 37 foreign countries, have delivered ove one hundred million miles of dependable and profitable transportatio Studebaker is the choice of men who know automotive value and appr ciate the importance of uninterrupted service as a business-building asse

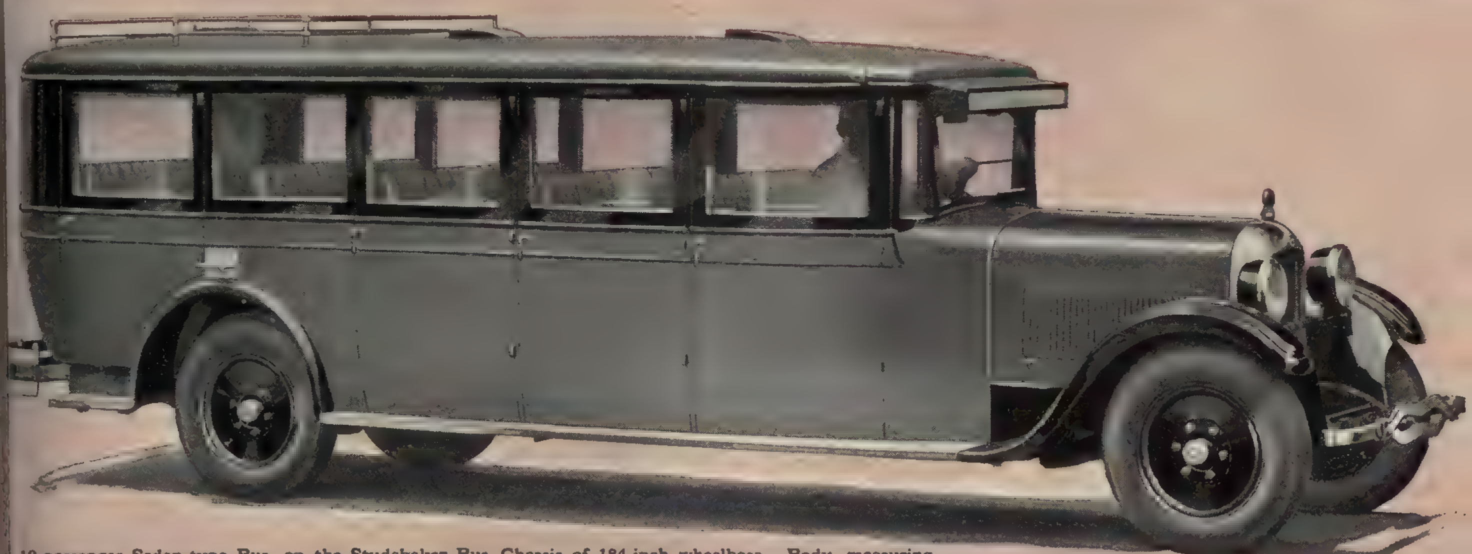
Two Studebaker Busses Can be Bought for the Price of One Truck-Type Bus

Studebaker cars are operated for less as proved in the case of M Nunnelee and 1,200 other Studebaker bus operators. The low purchas price enables the operator to buy two Studebaker units for the pric of one truck-type bus. Maintenance costs are considerably lowe because of the rugged construction and quality of materials employe and the simplicity of design.

Lower depreciation is experienced on account of the lesser initia investment and longer life. Recently Studebaker published a list o more than 250 operators whose Studebakers in bus service had attaine mileage figures ranging from 100,000 to 350,000, proving most con clusively the stamina and long life of Studebaker busses.

STUDEBAKER

More Studebaker Busse



19-passenger Sedan-type Bus, on the Studebaker Bus Chassis of 184-inch wheelbase. Body, measuring 198 inches long and 76 inches wide, is distinctive in design and appearance. Lacquer finished in a choice of two color combinations. Four wide doors, also driver's door and an emergency door on the left. Cross seats or semi-chair type seats accommodate 19 passengers in comfort. (Also available in full-chair type for 15 passengers.) Completely equipped. The coupon below will bring further particulars.

The Most Powerful Bus Chassis of its Size in the World

The Studebaker Bus Chassis has more power yet costs less —to equal its power, you must pay at least $2565 more

ACCORDING to the rating of the Society of Automotive Engineers, the new Studebaker Bus Chassis is the most powerful bus chassis of its size and weight.

There are 50 chassis on the market with *less power* and *more weight.*

The next bus chassis to equal it in rated horsepower costs $2565 more—practically double its price.

It excels in power. It excels in stamina. For the engine is matched by a chassis of remarkable durability.

Surplus Strength—Excess Mileage

Tremendous mileage records achieved under the hardest conditions of bus service in all parts of the country testify to the amazing strength and sturdiness of the Studebaker chassis.

Two busses on the Big Six chassis have covered 200,000 miles and 150,000 miles, respectively, in the service of the Northern Transit Company, Flint, Mich., and are still in daily operation.

The Cannon Ball Transportation Company, Portsmouth, Ohio, operates 13 Studebaker busses. Ten of these busses, bought in 1924, are Big Sixes—and already eight have covered over 100,000 miles; two over 150,000 miles.

Another Studebaker bus, owned by the Greensburg, New Alexandria and Blairsville Bus Company, New Alexandria, Pa., has achieved 165,000 miles since 1923—"and the total cost of parts for replacements is less than $75."

Lower
—first cost
—operating cost
—maintenance cost
—depreciation cost

More Profit for Operators

The new Studebaker Bus Chassis retains all the advantages of the Big Six Chassis—in low first cost, low operating cost, and low depreciation cost. But, in addition, it possesses many added factors of safety.

The staunch frame is braced by eight stout members. Powerful hydraulic brakes operate on four wheels, supplemented by service brake on rear wheels and by emergency brake operating on the drive shaft.

The Studebaker Bus Chassis is built in the two sizes proved to be most profitable: (1) 158-inch wheelbase for 12 to 15-passenger bodies and (2) 184-inch wheelbase for 15 to 18-passenger inter-city bodies and a 21-passenger street-car type body.

Hundreds of fleet owners and individual operators are buying Studebakers, convinced that they assure *"more profit per passenger mile."*

Six Body Designs, 12 to 21 Passengers, $3935 to $6150

Prices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal Budget Payment Plan—Small down payment and balance in convenient monthly installments.

12-Pass. (including driver) cross-seat Sedan-Type	$3935
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19-Pass. (including driver) cross-seat Sedan-Type	$5050
21-Pass. Pay-As-You-Enter Street-Car Type*	$5125
18-Pass. (including driver) side-entrance Parlor Car	$5300
20-Pass. (including driver) Parlor-Car De Luxe*	$6150

*Includes dual rear wheels

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Dept. B South Bend, Ind.

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We have .... busses at present.

Check below the Studebaker Bus about which you desire information.

Type: Sedan .... Parlor Car .... Street-Car Type ....

Capacity: .... Passengers.

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Tell us your bearing ne we will gladly co-operat you. Get our Catalog.

Ahlberg Ground Bearings

Averaged 47,780 miles per bearing in recent test!

A large Electric Railway Company, operating over 140 buses in city and intercity service, recently made an interesting ball bearing test, using four passenger buses over various highway routes. Four Ahlberg Ground Bearings and four new bearings of a well known and established brand were alternated in the right and left rear wheels of these four buses.

The buses were inspected periodically and the bearings were removed as soon as they showed wear to the point of looseness.

Here is the result:

AHLBERG GROUND BEARING

No.	Installation	No.	Mileage
1	Right rear wheel bus	380	72,844
2	Right rear wheel bus	378	27,146
3	Left rear wheel bus	381	57,456
4	Left rear wheel bus	371	33,677
	Total		191,123

NEW BEARINGS

No.	Installation	No.	Mileage
5	Left rear wheel bus	380	36,533
6	Left rear wheel bus	378	38,046
7	Right rear wheel bus	381	19,291
8	Right rear wheel bus	371	67,412
	Total		161,282

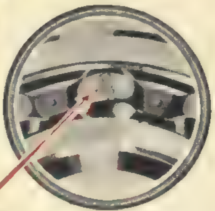
Average mileage **Ahlberg Ground Bearings,** 47,780 miles per bearing.

Average mileage New Bearings, 40,320 miles per bearing.

Average excess in favor of **Ahlberg Ground Bearings,** 7,480 miles per bearing.

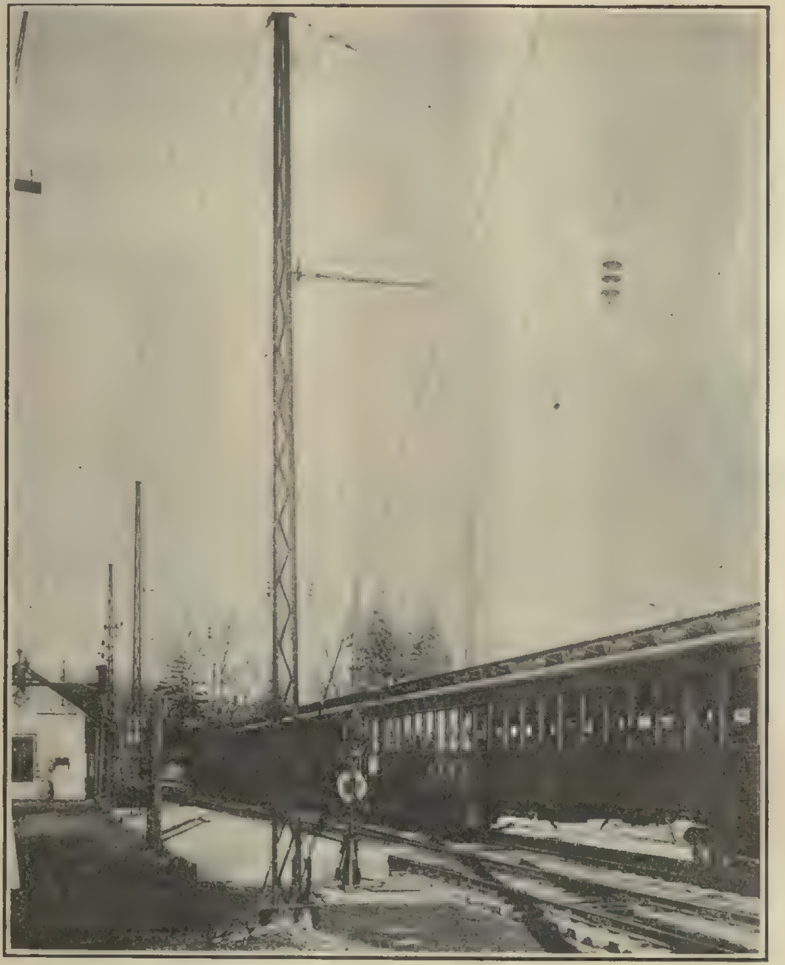
There is an **Ahlberg Branch** near you, maintaining a complete stock of bearings. Exchange your old bearings at this branch and save about 33⅓% in bearing costs, get greater mileage and lessen maintenance.

You are sure of the quality when you replace with **Ahlberg Ground Bearings.**



This mark means Ahlberg Ground

AHLBERG BEARING COMPANY



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are in keeping with the highest standards

Railways which follow the highest standards in methods, equipment and construction find Bates Steel Poles eminently desirable from the standpoint of strength, permanence and ease and economy of upkeep. They contribute appreciably to the appearance of the property, and their low first cost is a strong factor in their choice.

Whatever your requirements, whether poles, towers, or other types of structures, you will find a Bates proposal reasonable.

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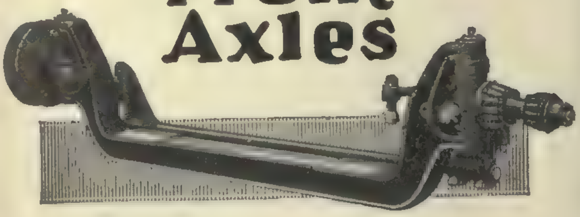

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Bus Endurance

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In covering 3,000,000 miles of highways, the Motor Bus *must* be constructed of superior units.

As pioneer manufacturers of FRONT AXLES ONLY we realize the severe test to which this unit is subjected. And time has proved that we do produce a SUPERIOR FRONT AXLE.

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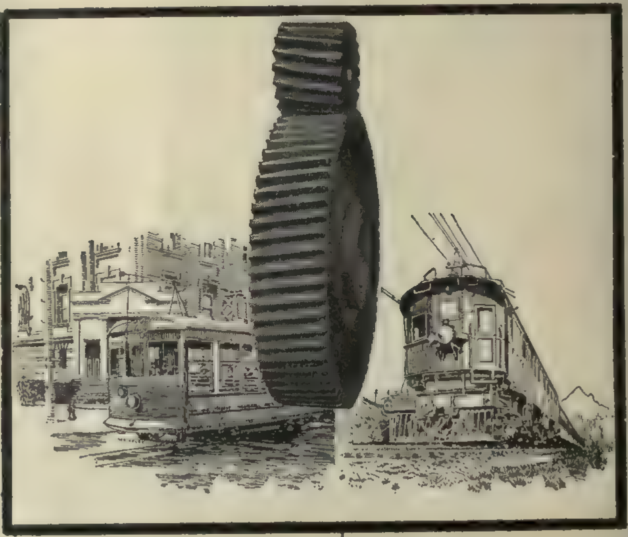
Do away with gear noise!



Nuttall Helical Gears meet present day requirements

Noisy spur gears are no longer tolerable. They're an unnecessary source of public irritation. Worse still, they wear faster and cost more in the long run.

The answer to the modernization problem in gearing is—Nuttall Helical Gears on all your cars. Their smooth, silent operation, at any speed, means better operating conditions all round.

R.D.NUTTALL COMPANY
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International stands for the best in timber preservation—sound timber, correct seasoning and scientific treatment under rigid chemical control. *International* has had poles in service more than 25 years and their condition indicates they are good for many more years.

International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont

The illustration shows International poles in service of the Southern Colorado Power Co. between Pueblo and Canon City.

International
Creosoted Yellow Pine Poles

LASCAR

The Arab legend still survives that Socotran women used to sit on the rocks and lure the lascar—or mariners—to disaster with their winsomeness.

Since earliest times the drawing power of attractive equipment is on record.

The big trouble with all the legends about such lure is that the poor lascar found that when he yielded to the temptation of attractiveness—that's all there was—there wasn't any more.

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Once you've attracted buyers with winsome equipment, don't let it end with just that—deliver the goods with good commutation.

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AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal: Chicago, 20-32 West Randolph Street: Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

THE WORLD'S STANDARD

"IRVINGTON"

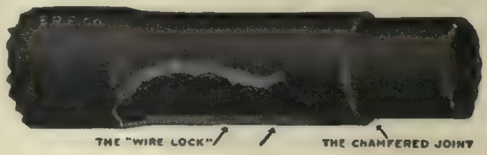
Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives in the Principal Cities

ELRECO TUBULAR POLES



COMBINE
Lowest Cost — Lightest Weight
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Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches	$4.50 an inch
4 to 7 inches	4.30 an inch
8 to 14 inches	4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E R J

POSITIONS WANTED

SUPERINTENDENT transportation; wide experience; fine record on city and interurban properties; credited with having built up one of the best groups of trainmen in Middle West and placing property on paying basis. Wishes to make connection with property in need of clean cut, progressive, capable transportation official. PW-940, Electric Railway Journal, Guardian Building, Cleveland, O.

YOUNG man wants position providing an opportunity of learning electric railway practice. Graduate of a co-operative coarse in electrical engineering. PW-941, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

OFFICIAL PROPOSAL

Bids: Dec. 15.

Car Advertising Space

Honolulu, Hawaii.

Sealed proposals for the leasing of car advertising space in the street cars and buses operated by the Honolulu Rapid Transit Co., Ltd., of Honolulu, Hawaii, will be received at their office, 1133 Alapai Street, Honolulu, T.H., up to 12 o'clock noon, Wednesday, Dec. 15, 1926.

Specifications as to bids may be obtained from the office of the Company, the Electric Railway Journal or Electric Traction.

The company reserves the right to reject any or all bids.

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built

West. 508 or G.E. 264 Motors

Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

"Opportunity" Advertising:

Think *"SEARCHLIGHT"* First!

G-02

Why Save It?

Equipment you have replaced, or for which you have no further use can probably be sold at a good price now. Later it may not be worth as much.

Weed out equipment and let a

"Searchlight" Ad

help you sell it promptly

G-9

TULC A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.

Cleveland, Ohio

Chicago Representatives: Jameson-Ross Company. Straus Bldg.

Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.

15 South Throop Street, Chicago, Illinois

FARE

BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

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Canadian Cleveland Fare Box Co., Ltd.

Preston, Ontario

COIN COUNTING And Sorting Machines CHANGES CARRIERS Tokens

ERICO

BRAZED **Rail Bonds** **ARC WELD**

Portable Arc Welding Outfits

The Electric Railway Improvement Co.

Cleveland, Ohio

NACHOD & UNITED STATES SIGNAL CO. INC.

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BLOCK SIGNALS

FOR

ELECTRIC RAILWAYS

HIGHWAY CROSSING SIGNALS

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

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Doyle, Kitchen & McCormick

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Air Receiver & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Regulators Voltage Current Synchronizing
American Brown Boveri Elec. Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
St. Louis Car Co.
Standard Steel Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Front
Shuler Axle Co.

Axles, Steel
Carnegie Steel Co.
Johnson & Co., J. R.

Babbitt Metal
Ajax Metal Co.
Johnson & Co., J. R.
More-Jones Brass and Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
More-Jones Brass and Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Ball
Ahlberg Bearing Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Lang Body Co.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co. The J. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Brushholders
Columbia Machine Works

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co.
Heywood-Wakefield Co.

Bus Wheels, Steel
Heywood-Wakefield Co.

Buses, Motor
American Car & Foundries Motor Co.
Brill Co. The J. G.
Fageol Motors Co.
Graham Bros.
St. Louis Car Co.
Studebaker Corp. of America

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The, J. G.
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas, Rail
Brill Co., The, J. G.
St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co. The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
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General Electric Co.

Castings, Brass Composition or Copper
Ajax Metal Co.
A. & J. M. Anderson Mfg. Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
St. Louis Car Co.
Standard Steel Works

Castings, Malleable and Brass
Bemis Car Truck Co.
St. Louis Car Co.

Castings, Nichrome
Driver-Harris Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

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Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Chairs, Parlor Car
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
A. & J. M. Anderson Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Circuit Breakers (Oil)
American Brown Boveri Elec. Corp.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

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Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

Condensers
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Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heat Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Amer. Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantasote Co., Inc.
St. Louis Car Co.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.

Dealer Second Hand Rails
Electric Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
National Pneumatic Co.
Safety Car Devices Co.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co.
Safety Car Devices Co.

Drills, Track
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Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
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Ohio Brass Co.
Westinghouse E. & M. Co.

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Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Railway Trackwork Co.

Electric Locomotives
St. Louis Car Co.

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Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
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Archbold-Brady Co.
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Bibbins, J. Rowland
Brennan, F. J.
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Day & Zimmermann, Inc.
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Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly, Cooke & Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gasoline
Waukesha Motor Co.

Engines, Gas, Oil or Steam
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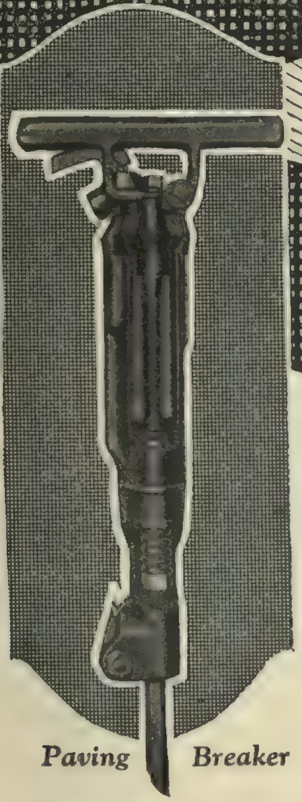
Cincinnati Car Co.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)



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86-PC

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Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
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Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
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Ohio Brass Co.
Westinghouse E. & M. Co.

Furnaces, Electric, Steel Melting
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General Electric Co.
Westinghouse E. & M. Co

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General Electric Co.

Gaskets
Westinghouse Tr. Br. Co

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Westinghouse E. & M. Co

Gas Producers
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Cincinnati Car Co.
St. Louis Car Co.

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Ohio Brass Co.

Gear Blanks
Brill Co., The. J. G
Standard Steel Works

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Electric Service Supplies Cc.
Westinghouse E. & M. Co

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Electric Service Supplies Co
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.

Generating Sets, Gas-Electric
General Electric Co.

Generators
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General Electric Co.
Westinghouse E. & M. Co

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
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Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

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General Electric Co.
Ohio Brass Co
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Consolidated Car Heating Co
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists, Portable
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

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Irvington Varnish & Ins. Co.
Okonite Co.
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Westinghouse E. & M. Co.

Insulatig, Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish and Insulator Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins Co.
Okonite Co.
Okonite-Callender Cable Co
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co
Hubbard & Co.

Insulators (See also Line Materials)
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Elec. Service Supplies Co
General Electric Co.
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Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars)

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Elec. Service Supplies Co.
National Ry. Appliance Co.

Joints, Rail (See Rail Joints)

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Bemis Car Truck Co.
Brill Co., The J. G.
S. K. F. Industries
St. Louis Car Co.

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General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Electric Service Supplies Co
Ohio Brass Co.

Letter Boards
Haskelite Mfg. Corp.

Lightning Protection
Elec. Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Wm. Wharton, Jr. & Co.,

Locomotives, Diesel Electric
American Brown Boveri Elec. Corp.

Locomotives, Electric
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Locomotives, Oil Engine Electric Driven
Ingersoll-Rand Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.,

Manganese Steel Switches, Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Motor and Generator Sets
American Brown Boveri Elec. Corp.
General Electric Co.

Motor Buses (See Buses, Motor)

Motors, Electric
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., The J. G.
Electric Service Supplies Co.
Heywood-Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

Oxygen
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Electric Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

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Ingersoll-Rand Co.

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Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
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Wood Co., Chas. N.

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Pins, Case Hardened, Wood and Iron
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Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

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Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.
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Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
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Westinghouse Traction Brake Co.

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Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)

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A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll Rand Co. (A. S. Cameron Steam Pump Wks.)

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International Register Co.
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Ramapo Ajax Corp.

Rail Grinders (See Grinders)

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Rail Joint Co., The

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Elec. Service Supplies Co.
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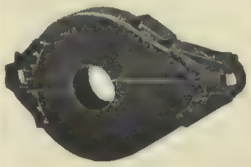

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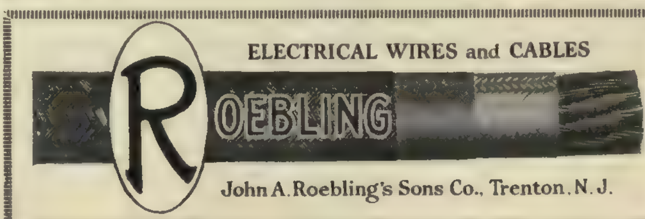

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Maintenance of Equipment	5.71	4.70
Power	3.42	0.70
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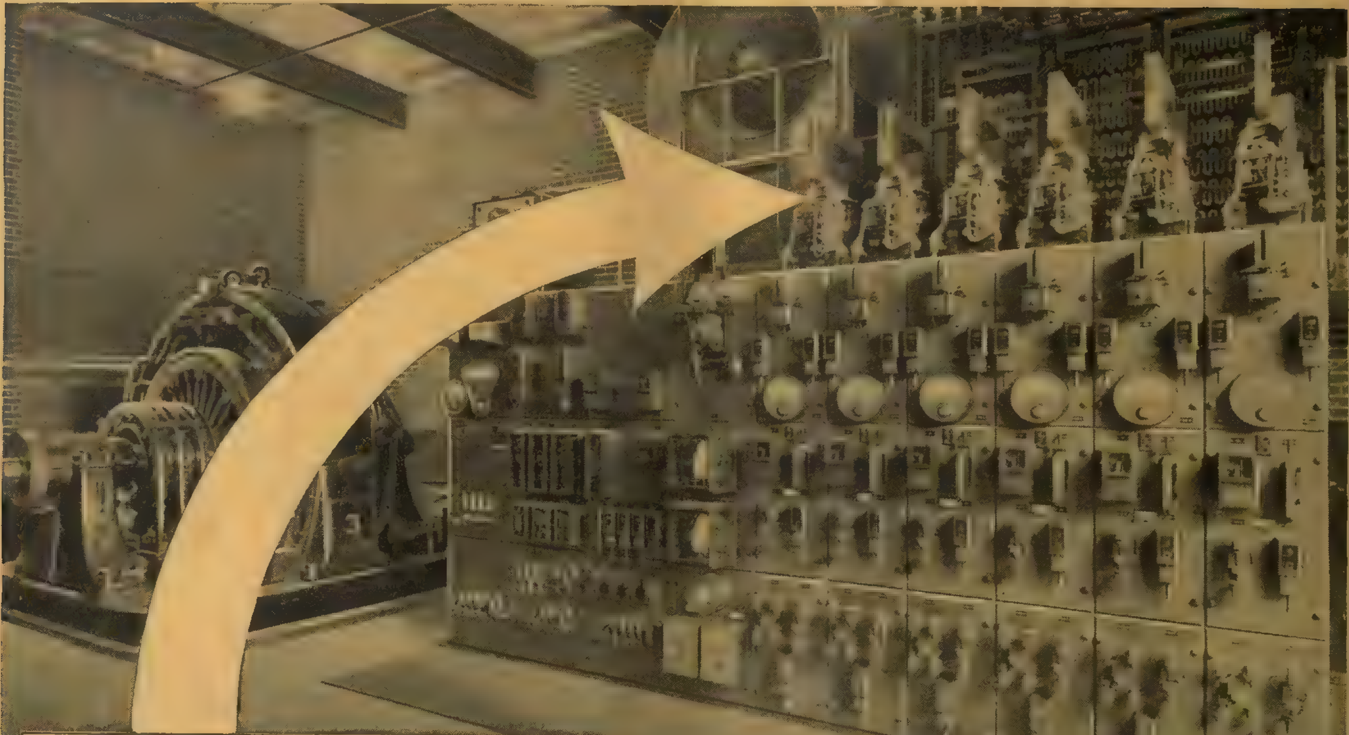
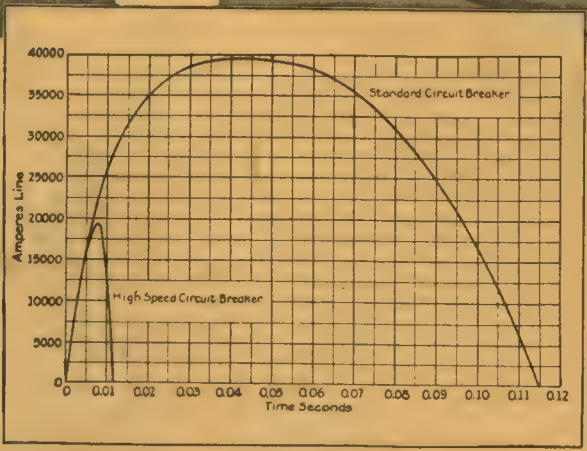


Franklin Ave. Substation, United Railways of St. Louis



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3-16

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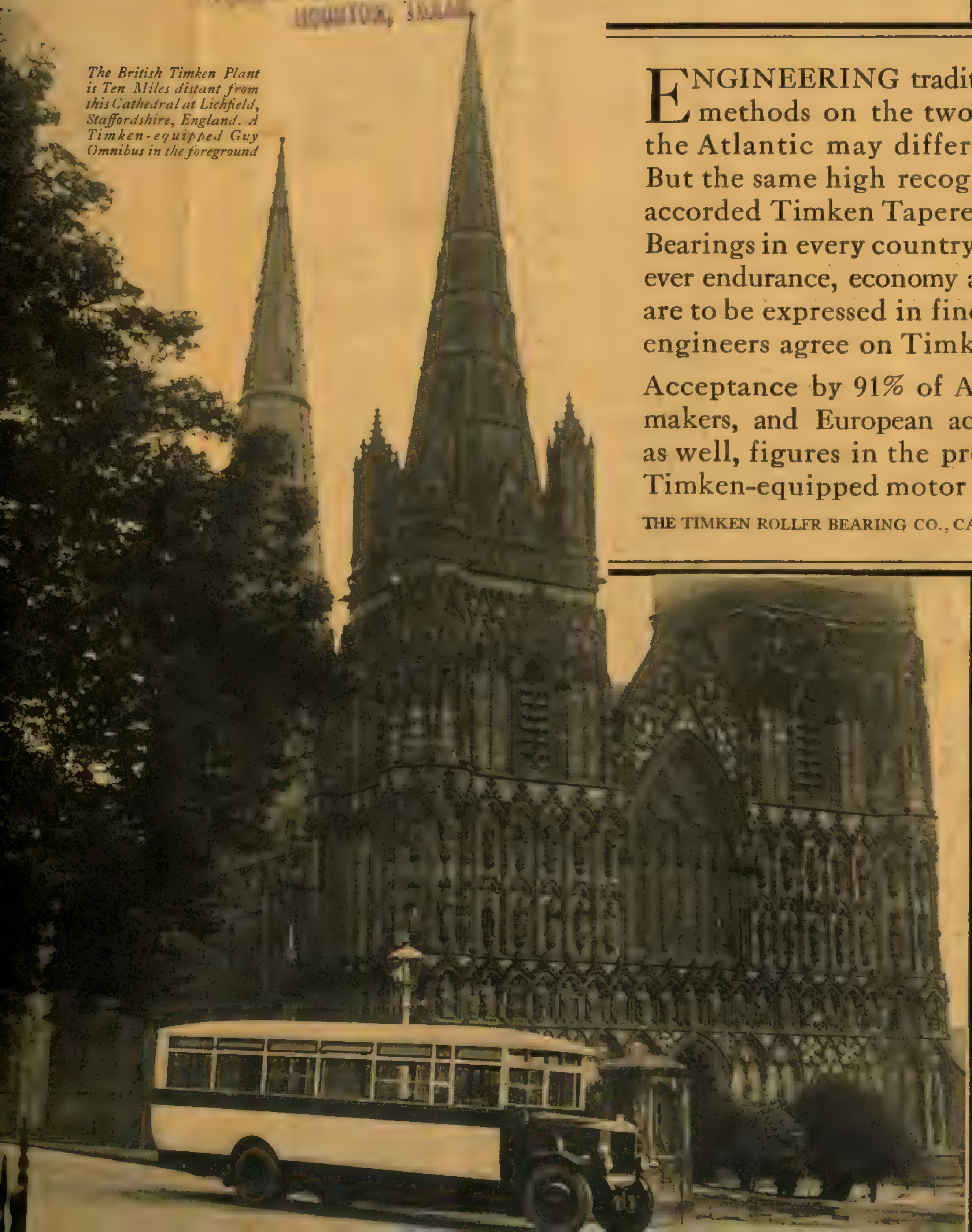

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No. 18

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BY EDWIN B. KATTE.

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From the
Coffin Award Briefs

IT WOULD obviously be a considerable task for any electric railway executive to dig out for himself the new developments disclosed in the voluminous briefs filed for the Coffin prize competition. Nevertheless every progressive operator is vitally interested in this annual array of accomplishments.

For that reason ELECTRIC RAILWAY JOURNAL has made it an annual practice to publish, soon after the convention, a complete abstract of the winning brief, together with the new developments disclosed by each property entering the competition. The brief of the Pennsylvania-Ohio Electric Company, which won the 1926 award, was published in the JOURNAL of Oct. 16. Some of the new practices developed in Baltimore appear in this issue. Next week's JOURNAL will be devoted very largely to articles presenting new ideas developed by the other contestants.

To save the reader's time, practices that have already been published are not repeated. Some of the contestants this year found it convenient to use clippings or reprints from the JOURNAL as exhibits in their briefs. Since the Coffin Award Foundation is prepared again this year to publish a complete résumé of the material from all the briefs in book form, the JOURNAL confines itself to presenting to the industry promptly only the essentially new things disclosed by the various contestants.

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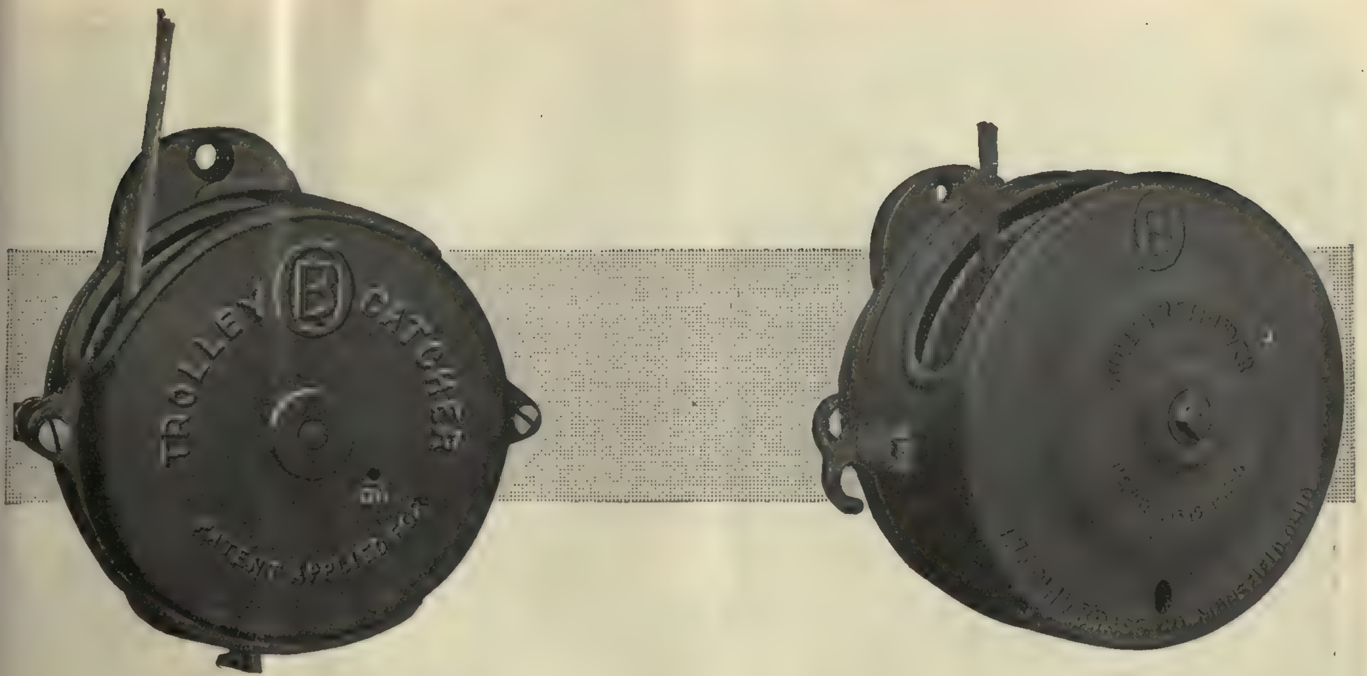

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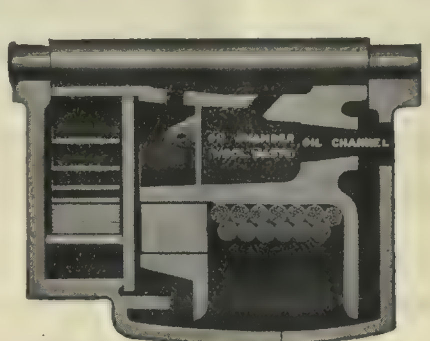

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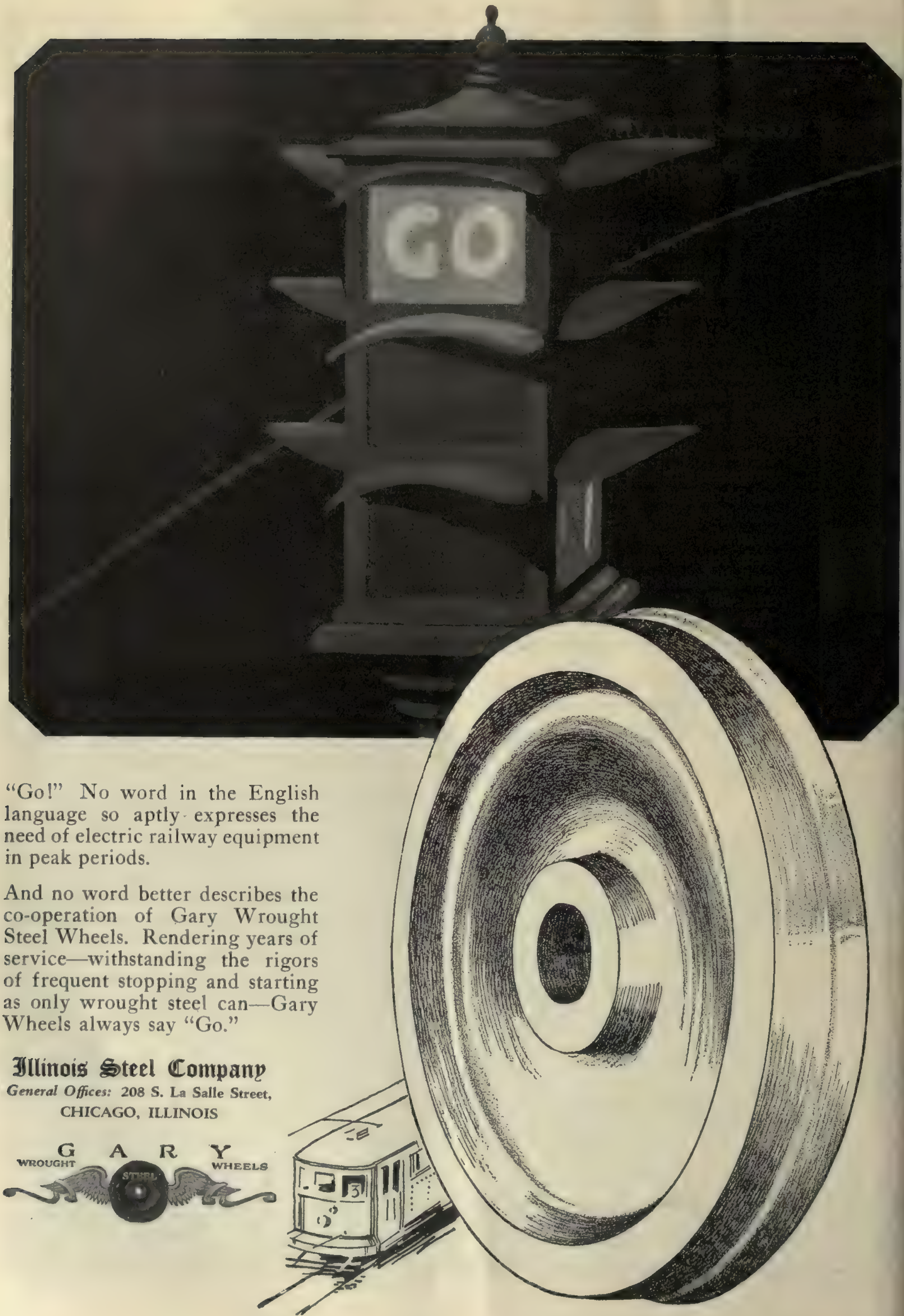

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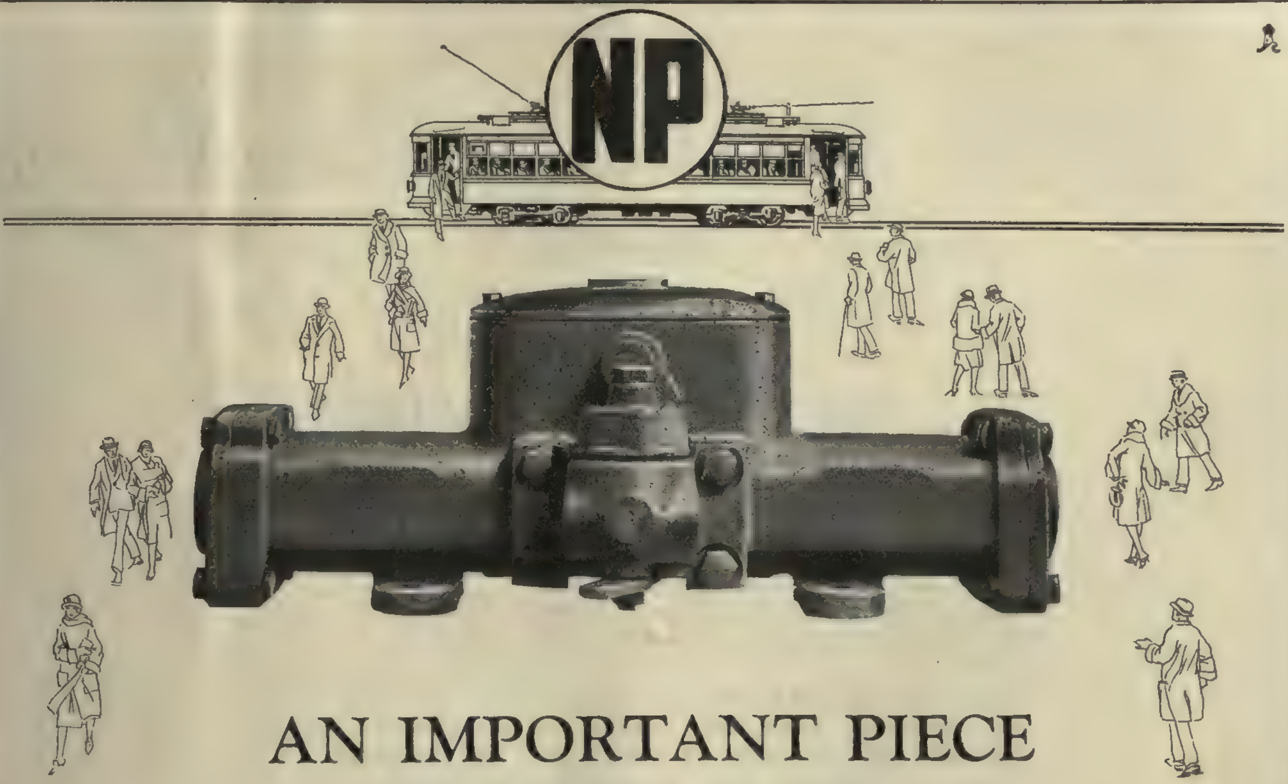

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Light on the
Bus Braking
Question

The ABC's of
Bus Brakes and Braking Systems

Compressor Mountings and Drives. There are three general types of compressor mountings.

Front end: mounted on the front cover plate of the vehicle engine and driven direct from an eccentric on the main crankshaft.

Side: mounted beside the vehicle engine and driven by gears, chains, belts, an auxiliary shaft, or some combination of these.

Transmission: mounted beside the transmission and driven through gears from a special power take-off.

The Side and Transmission mounted compressors are not difficult to install and can be put on practically any vehicle. However, if the compressor is efficient, trouble usually develops in the drive, particularly on the Side mounted type. The pulsating compressor load wears gears, chains, and universals rapidly. Chains and universal renewals are common, and where the timer is driven from the same shaft timing trouble appears. The Transmission-mounted compressor is less subject to drive trouble as only gears are used and of course no timer or other trouble can develop from it. However, it is inclined to become noisy and is not the simplest or most satisfactory installation.

The Front-end mounting and drive is by far the simplest and most rugged. When installed it is practically a part of the motor and not a piece of auxiliary apparatus. An eccentric on the main engine crankshaft drives it. There are no gears, chains or universals. The compressor hasn't even a crankshaft of its own. It has less than half the number of parts contained in any self contained or auxiliary compressor. Vibration is reduced to the lowest possible point because the pulsations are absorbed by the main engine crankshaft and bearings—those designed for the heaviest duty.

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This is the seventh of an informative series on Bus Brakes. The series consists of:

A—What Brakes Must Do.
B—How many wheels should brakes go on?
C—Self-equalization and brake adjustments.
D—Curing the skid.
E—Metal to metal or molded linings?
F—Braking Power.
G—Compressor Mountings and Drives.
H—Compressor Cooling.
I—The Control Valve.
J—Maintenance on Different Types.

These topics will appear in the above order. Address any comments, suggestions or requests for advance information to:

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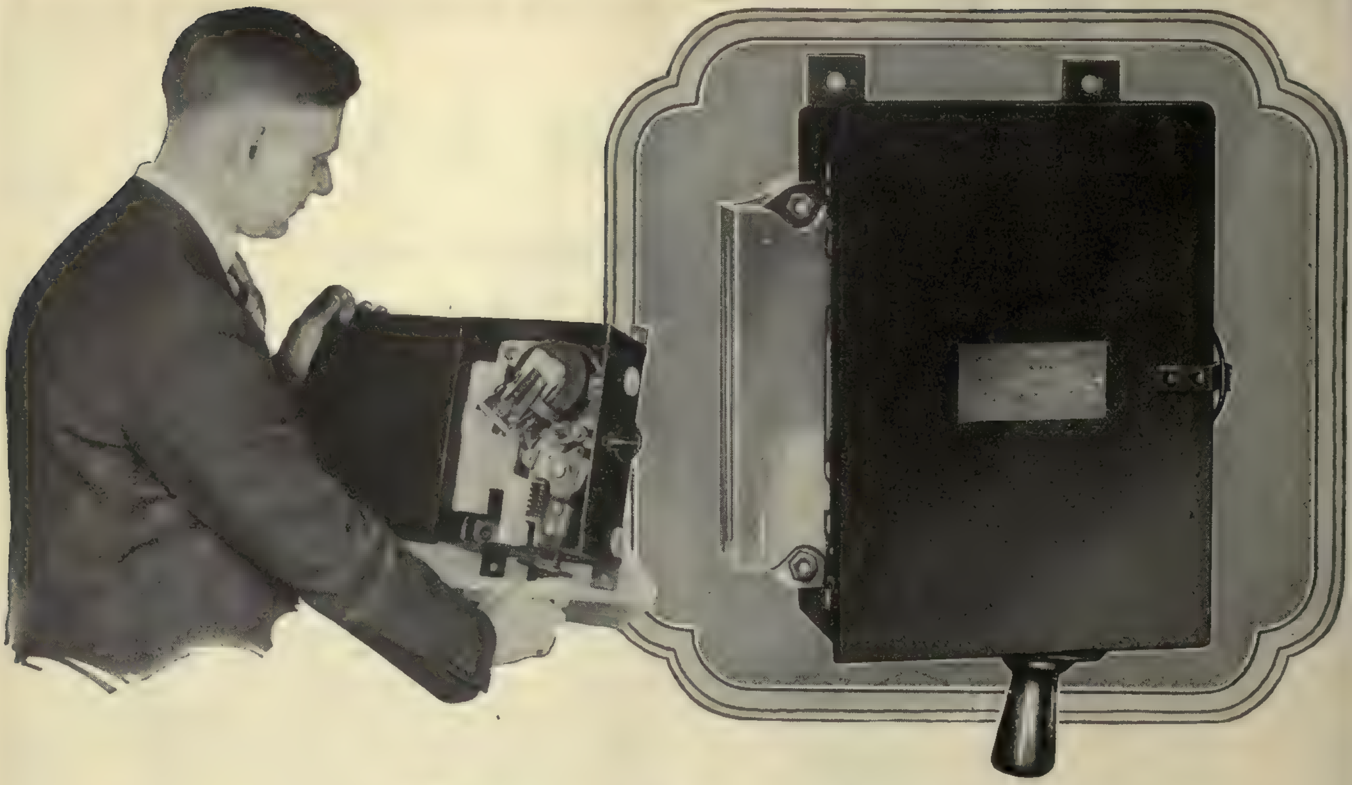

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You will observe how light in weight it is and how very accessible. Simply by the removal of three screws, the whole operating mechanism can be lifted from its case. You will appreciate so few wearing parts.

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Modern Equipment Standards

330-7

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 68 New York, Saturday, October 30, 1926 *Number* 18

The Bus Case Is Sound Provided Its Import Is Understood

REPRESENTATIVES of the Bus Division of the A.A.A. have recently submitted to the Interstate Commerce Commission their views regarding the principles that should govern interstate bus regulation. Boiled down, these include two primary contentions: First, that interstate bus operation is essentially a local matter and should be regulated by the state commissions in the states affected; second, that bus transportation is an industry in its own right, that it is an addition to the sum total of transportation facilities offered the public and that it should be regulated regardless of its effect on existing carriers.

Most transportation men are agreed with the first principle set down, namely, that interstate bus operation in its present stage of development is essentially a local matter and of interest primarily to the states concerned. It is also probable that bus operation of the scheduled common carrier variety will always remain largely a local service. Although long distance operations may be expected to expand in the next few years, these operations will be of the special party or tour variety rather than regularly scheduled common carrier service. In this form of bus operations the elements of pleasure and sightseeing are large factors in determining the character of the service rendered. Time and cost are secondary rather than primary factors. Such service, if properly developed under competent and responsible management, offers an attractive substitute for tours in individually owned machines and may be expected to draw its passengers from that source rather than from existing common carriers. Thereby it fulfills the primary requirement for being considered a transportation service in its own right. It offers an entirely different character of service at rates needed to maintain quality and reliability. Such operations seem to fall outside the classification of common carriers on fixed schedules and routes.

In considering bus operations which fall within the limits of common carrier service the question of whether these operations should be judged on their own merits without regard to existing carriers depends entirely on what the nature of the operations is to be. If the bus service is merely a duplication of the rail service on highways, both in the character of operations and rates of fare, then the bus contention is entirely unfounded and the existing carriers should most decidedly be considered in judging the necessity for the new service. Under such conditions bus operations are merely a duplication of existing facilities and represent an economic loss to the community.

When two vehicles are operated where one was operated before, with no corresponding increase in traffic, some one stands to pay the piper, and that some one is the man who buys transportation service. Under such conditions the bus does not offer something new, but merely tears down something which already exists. Only when a rail carrier is consistently operating at a loss, and when it is established that such operations cannot be made profitable, is the substitution of buses for rail service justified. Surely bus men are themselves in a delicate position when advocating that no consideration be given the existing carriers in determining the necessity for a new bus line, for what is sauce for the goose is also sauce for the gander. If the mere desire for more transportation is to become ample basis for granting certificates to operate, then the holders of existing certificates of convenience and necessity are indeed the possessors of nothing more than scraps of paper. Carrying this reasoning to the *reductio ad absurdum,* a maximum amount of service would be provided on a given route by granting operating rights to all who applied.

But would it? What about the character of the service rendered? And what about the cost of giving the service? That is where this reasoning falls down, for duplication of service in kind represents economic waste, and when there is economic waste in rendering utility service the user pays the bill, either in his fare or in being forced to put up with an inferior ride.

Bus operations may be considered in their own right without regard to existing carriers only when the service rendered is of an entirely different character at rates high enough to insure maintenance of the quality. When the bus service offers a different *character* of service at distinctive rates it represents an addition to transportation facilities and not a duplication. Under such conditions the bus creates its own patronage instead of drawing from the riders on the existing carriers. *And the rate of fare charged is the key to the situation.* With the rate of fare sufficiently higher than railway rates and with both regulation and competition operating to keep the character of service rendered up to the level of the rate charged, then the bus, even when operated parallel to an existing carrier, seems to have some claims for being considered a transportation agency in its own right.

The bus men cite the example of telephone and telegraph service as precedent on which to base their own case. Consideration for a moment of the difference in the character of these services and of *the rates charged* shows the situation in its proper light. Though these are both communication services the telephone has not attempted to duplicate the telegraph, but provides a service that is entirely different in character at an entirely different rate. The bus has before it a wonderful future, provided that its own advocates rise to their opportunity. It is high time that bus men stopped thinking in terms of railway passengers, railway rates and railway replacement and devote themselves to building what they claim to represent—an industry in its own right.

Plans for Next Year's Convention Should Be Made Early

NOW while the thoughts of the 45th convention are still fresh in mind, it is a good time to think about the 46th. In previous years, the location has been decided some time during the late winter or spring, leaving only a short time before active work commenced.

Many companies, both manufacturing and operating, are making their budgets for next year. The location of the convention has a decided bearing on such estimates. Then, too, the work of several committees of the association, such as that on membership, will find it advantageous to approach prospective members with definite plans.

Few people realize the great volume of work behind the preparation of a convention having the enormous proportions as that just witnessed in Cleveland by more than 8,000 delegates. That, of course, is a compliment to those who prepared it. Nevertheless, besides the work of the convention committee and the director, there is much necessary work on the part of manufacturers that could in a measure be better directed if focused on a definite objective.

Also, the date bears some thought. The first week of October has for years been chosen. The reason for this seems to be tied into the more or less stereotyped Atlantic City schedule, fitting in with hotel accommodations, etc., following the season's rush to that resort. In Cleveland these factors did not prevail. The accountants, principally, are affected, since the first of the month is obviously the busiest time for them and this has been a factor that has been responsible for preventing many delegates of this important association from attending.

With the ever-growing size of the annual convention and its increasing importance in this period of the industry's recovery it seems particularly advisable to plan earlier that we may plan better.

Make Better Use of Existing Streets Before Spending Money to Widen Them

IMMEDIATE widening of roads in and about the large cities of the United States is being vigorously urged by the American Road Builders Association as a means of relieving traffic congestion. The enormous expenditure necessary for such an undertaking is justified, it is claimed, because the cost of traffic delays is greater than would be the cost of widening and improving the roads. Despite the plausibility of this argument considerable uncertainty exists as to the actual measure of relief that would be afforded by simply increasing roadway areas. So far as city traffic is concerned, experience shows that additional street space is absorbed as rapidly as it is provided without any marked diminution of congestion. Before spending vast sums to widen the streets, careful consideration might well be given to the possibilities of making better use of those we already have.

Observation clearly shows that the actual capacity of existing streets has by no means been reached. The volume of traffic that can be moved over a given route in a given time depends on the effective width of the roadway and the average speed of vehicles. Generally speaking, both can be increased with comparative ease.

On our busiest streets parked automobiles often occupy anywhere from a quarter to two-thirds of the roadway. Angle parking and double parallel parking are permitted in the very cities where the gravest concern is felt concerning the traffic situation. Huge vans back up to the curb and spend hours loading or unloading regardless of the extent to which they block the movement of other vehicles.

To make matters worse the average speed of vehicular movement in many streets has become so slow that the horse is replacing the automobile for certain kinds of trucking in our large cities, because the cost of waiting is thereby reduced. A tremendous number of unnecessary delays occur. Time and again a single vehicle making a left-hand turn blocks two or three lines of moving traffic. Policemen frequently exercise poor judgment in controlling traffic at busy intersections. On the other hand, automatic synchronized signal lights often hold large numbers of vehicles motionless although there is no cross traffic moving.

Whether or not a program involving wholesale widening of roads is desirable is not for the electric railway industry to say. In the cities, however, results are likely to be disappointing if it is undertaken on the theory that traffic congestion will thereby be substantially relieved. Unless provision is made to restrict the use of widened streets to traffic movement rather than the storage of vehicles, there will be an increase in storage space but little real improvement in facilities. Making more efficient use of the existing roadway, rather than building more roadway to use inefficiently, offers a quicker and better solution of the problem.

Light for Electric Railways in Professor Ripley's Criticisms

THE latest article in the series by Prof. W. Z. Ripley on corporate finance published in the *Atlantic Monthly* appears in the November issue of that magazine and undertakes to throw light on the financial practices occasioned by the rapid growth of the power and light industry. Approaching this question from the standpoint of the public's interest, Professor Ripley confines his discussion to the holding company. After setting up what he considers the weaknesses and dangers attending the rapid growth of these organizations, the author deserts his customary high plane of scientific inquiry and yields to the temptation of becoming rhetorical. This is done by inferring that some of the conditions described are sufficiently general to warrant federal investigation. That is obviously unfair. To an industry which has made such phenomenal progress there is bound to be attracted the speculator who stretches the limits of sound practice. There is ample evidence—and the author cites some of it—to indicate that those engaged in building for the future as well as the present have decried some of the very practices which are criticised.

Although discussing primarily the power and light industry, and particularly the situation of the holding companies, the article touches a few points of interest to electric railway men. Little cause to quarrel can be found with the professor in contending that sale of stock direct to customers carries with it the assumption of increased responsibility by the utility and that this activity should be properly safeguarded in the public interest, as well as in the interest of the utility itself. But in the case of the electric railways there is little danger for some time to come of "overselling" securities direct to the public. At the present time the principal problem of the electric railways is that of re-establishing their credit. However, this is a good time for the industry to fix in mind the responsibilities as well as the advantages that attend the sale of stock to its patrons.

Electric railways have had considerable experience with the evil results of inadequate provision, during a period of adequate rates and profits, for depreciation and obsolescence. During periods of prosperity, when there is no question of increased rates involved, there is a natural disposition on the part of regulatory authorities to permit adequate reserves to be set up. The precedents thus established are extremely important to the preservation and development of the industry in leaner years. There is now a growing realization in the electric railway industry that failure to set aside adequate depreciation allowances in the past is responsible for the large amount of obsolete equipment on its hands today. Now that there is strong evidence of steadily improving conditions it is important that a definite policy be adopted as rapidly as possible looking to the establishment of adequate renewal reserves. Only in that way can the industry hope so to preserve its plant and equipment as to meet effectively the conditions set up by modern transportation requirements.

New York Five-Cent Referendum Act Defective

ELECTION day in New York, Nov. 2, will not see the question of a 5-cent fare referendum submitted to the voters. The Court of Appeals has effectually squelched any such proposal. The matter had been passed upon before by the lower courts, but only as to the regularity of the proceeding, not on any of the technical points involved.

So an end has been put to an obnoxious piece of legislation sired by former Mayor Hylan and nurtured by former Comptroller Craig. Although these gentlemen were anathema or worse one to the other in office, they appeared in the rôle of Damon and Pythias in this little piece of hokum, which fixed the citizens' attention upon the 5-cent fare alone. The unrevealed effect, however, would have been to prohibit action by the authorities, thus making transit contracts immune to change.

The opinion of the court was to the effect that if there was a shred in the law that could be saved, it was not worth saving. Consequently it declared it to be folly to submit this "maimed and worthless thing" to the voters. In other words, as it now stands revealed the legislation was an attempt to fool the public into the belief that a vote was merely a vote for or against the 5-cent fare. This deceit was continued even in the form of the question to be printed upon the official ballot which mentioned only the fare.

In New York there has never been a clean-cut expression of public opinion on the vitally important questions of an independent subway system and municipal operation. By this bill a neat trap was laid to trick the people into a vote that (without their knowing it) meant an independent system and municipal operation, because with agreements between the city and the existing companies practically prohibited, no other course than municipal operation would be possible. The bill that the courts have scotched by their action would have perpetuated the present transit conditions in New York, made intolerable by the very people who, not content with their work of opposition while in office, sought by this impudent means to bedevil things still further.

All the Noise Is Getting Nowhere

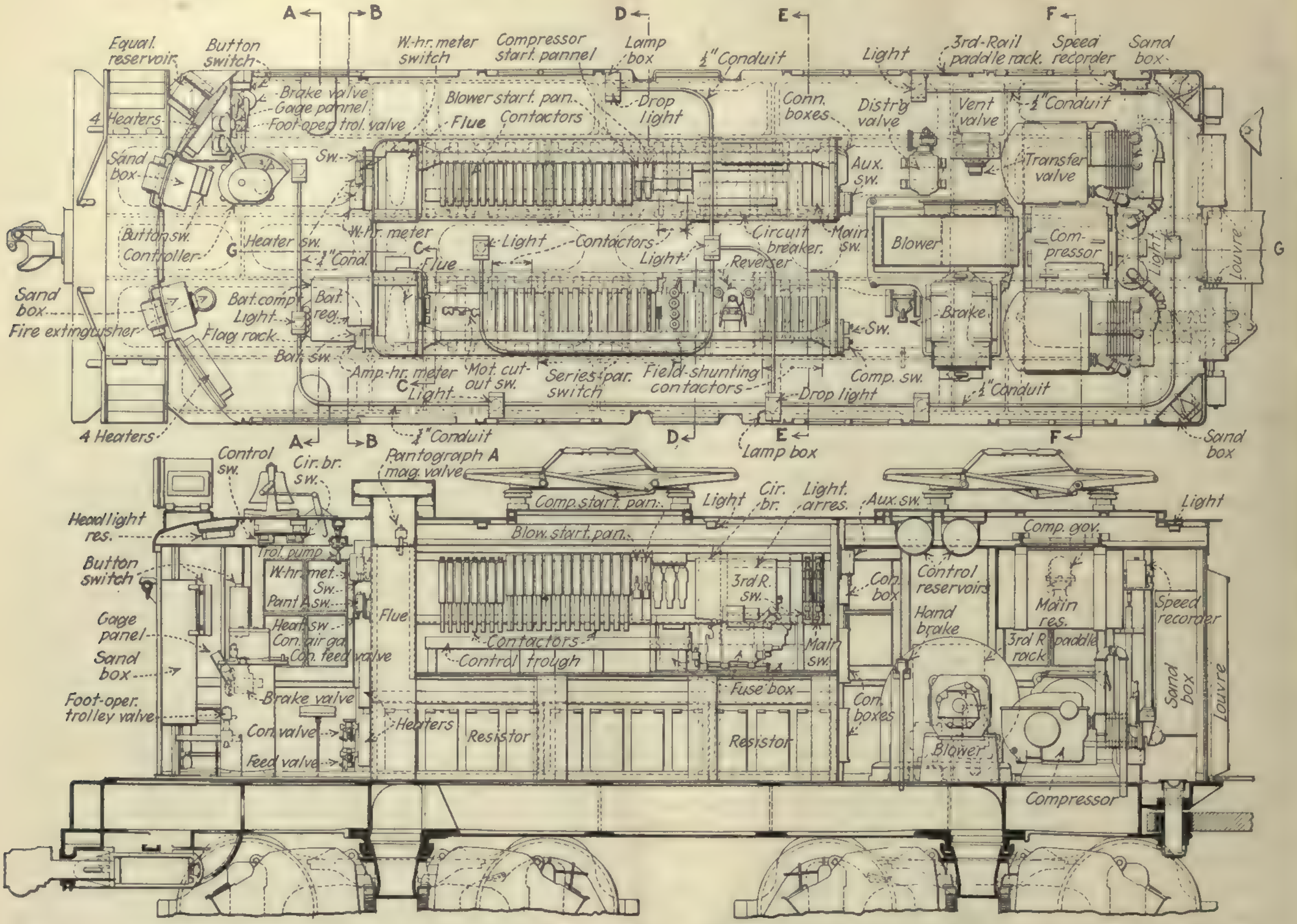
ANY disposition, if such there really be, by the two major steam railroads of Pennsylvania to enter into competition in kind by the operation of buses in territory already served by the electric railways or by other legalized carriers deserves to be condemned, but it does seem that the over-zealous Governor Pinchot, in refusing to sanction charters for subsidiary bus companies sponsored by these railroads, has gone out of his way to malign the Public Service Commission. The Governor pretends to foresee the steam carriers swallowing up the present highways to their own aggrandizement, and then proceeds intemperately to lash the Public Service Commission.

Off hand, the correspondence between the Governor and the commission over the matter might make it appear that the controversy is a purely local one, grounded in a manifest disapproval of the personnel of the commission as now constituted, but it really goes deeper than that. It is an indirect attack on regulation itself. The commission appears to be cognizant of the need on its part to protect the existing carriers from encroachment one upon the other. The Governor says, however, that if he were to sign the railroad bus subsidiary charters, the commission could grant certificates of public convenience without anybody's being able to stop it. There has, however, been no evidence of this. Any such action on the part of the commission would probably be in direct violation of the rights of the existing carriers, provided, of course, that these carriers are prepared to meet their contractual obligation.

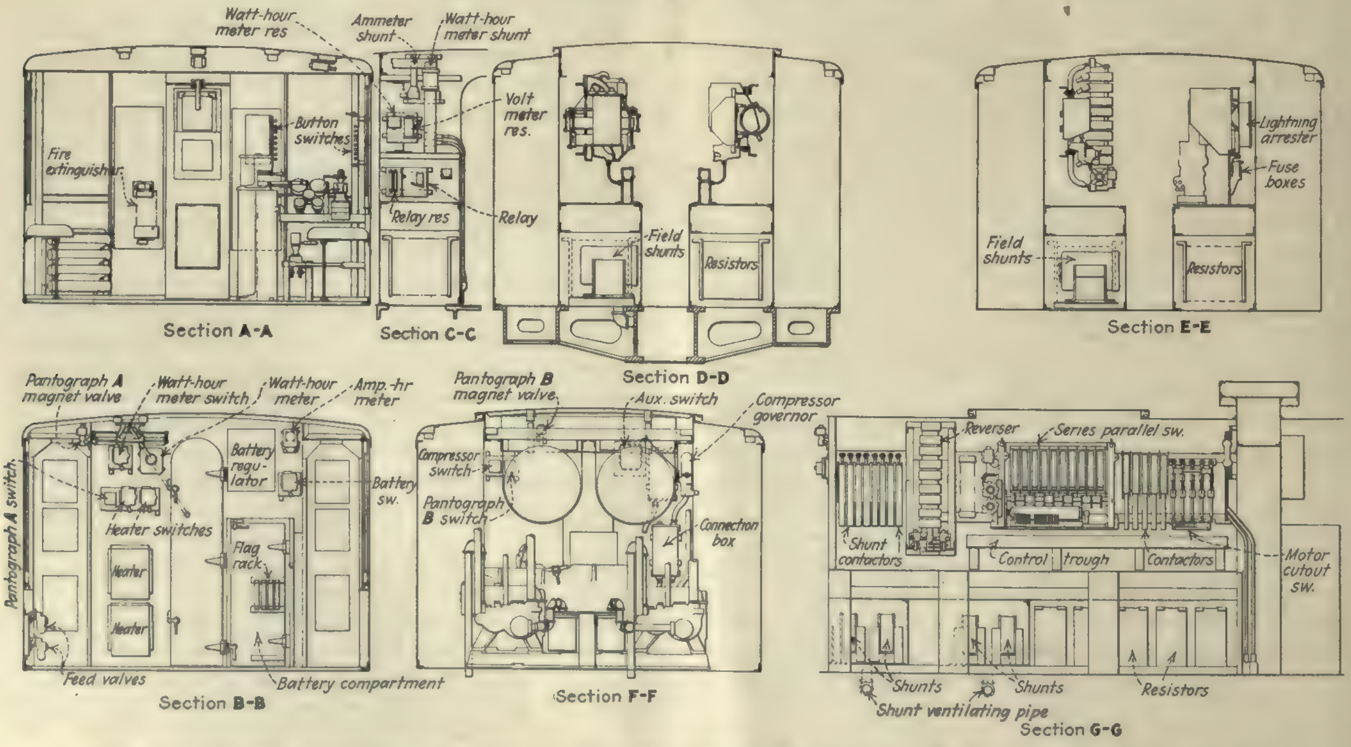
Still the fear that the Governor purports to feel is shared in other quarters. This is made plain in a statement by Powell Evans, president of the Schuylkill (Electric) Railway, Girardville, published on Oct. 20. Reference to this statement is made elsewhere in this issue. It deserves careful attention not only in Pennsylvania but in other states. Mr. Evans says that the electric railways urged the facts upon the steam railroads patiently and temperately before the bus programs of these companies were finally adopted, but without effect, "whereupon protest was made to the Governor, the Public Service Commission and the courts, with the result that the charters were denied." He says that the electric railways throughout the state "propose to resist to the utmost the unjustifiable aggression initiated by the steam lines against established, responsible and equally legitimate local competitors."

In other words, here is a situation in which a Governor pretends that the members of the Public Service Commission cannot be trusted to protect the rights of the small against encroachments by the large corporations, in which the commission says that each applicant for the right to operate must prove his case, and in which the electric railways have been unable to impress the steam railroads with a point of view they rightfully regard as reasonable. With due respect to all the parties involved, it certainly would seem that nothing can be gained by further blind adherence, particularly on the part of the steam railroads, to the policies that have so far marked the progress of this controversy. The very mutuality of their interest ought perforce to bring the steam railroads and the electric railways together to devise a plan eminently fair to each. It is not the first time this has been found to be the only adequate way to avoid consequences terrible alike to the carriers and the public.

New Electric Engines Weighing More than 170 Tons Placed in the Freight Service of New York City



Floor Plan, Above, and Sectional Elevation, Below, Show the Layout of Equipment that Is Mounted Above the Cast-Steel Floor Frame of This Latest New York Central Electric Locomotive. Air Ducts Between Blowers and Propulsion Motors Built In as Integral Parts of the Floor Frame



Five Cross-Sections Shown Above Illustrate the Compact Grouping of Apparatus. In the Lower Right-Hand Corner Is a Partial Longitudinal Section Showing the Control Assembly

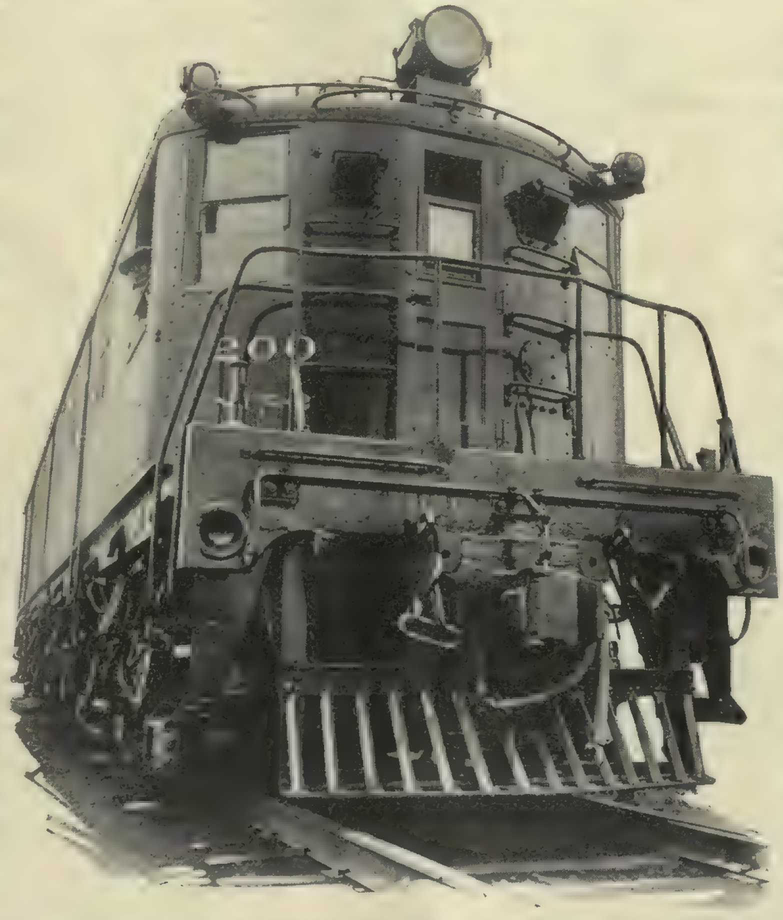
New Electric Freight Locomotive Placed in Service by New York Central

Two Units Just Received Perform Well Within Specification Limits—Designed to Operate from Third Rail or Overhead Construction of Present Type or that Contemplated on West Side Tracks—Three Running Connections Are Provided with Two Steps of Inductive Field Shunts, Allowing Nine Running Speeds with Full Load Varying Between 4 M.p.H. and 24.8 M.p.H.

By Edwin B. Katte
Chief Engineer Electric Traction, New York Central Railroad

THE New York Central Railroad's new electric freight locomotives are designated as Class R and will be used for hauling through freight on the electric division and west side freight tracks in New York City and vicinity.

These engines, two of which have been purchased, differ from any previous electric locomotives of the company in that they are built in two nearly identical units. The units are connected by a special coupling and can be separated for shop purposes, but are numbered alike and will not be separated in service. The designed weight was 170 tons, the actual scale weight of the first locomotive is 353,600 lb., all on the drivers. In an illustration is shown the general outline of the locomotive and the principal dimensions.



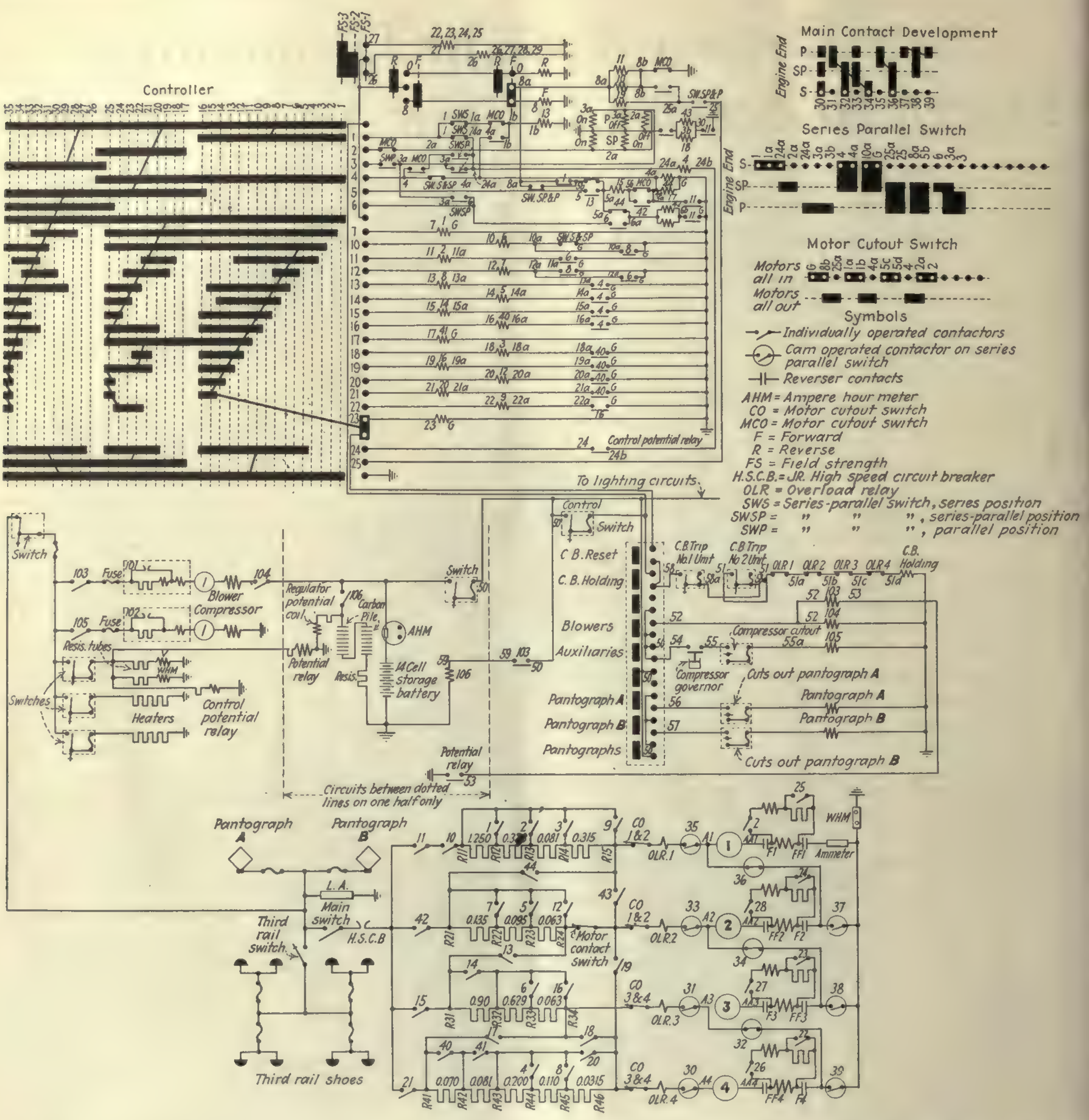
More than 100 Cars Weighing 3,000 Tons Were Hauled by This New Engine Between New York and Harmon at Varying Speeds up to 34½ M.p.H.

Each unit consists of a box type cab mounted on two four-wheel swivel trucks, not articulated. The floor frame is a single steel casting, as shown in an accompanying illustration. This use of large steel castings for underframes and truck frames is the most notable mechanical feature of this locomotive and simplifies the construction by eliminating great numbers of bolts, nuts and small parts. Extending longitudinally through the middle of the underframe casting is a large duct for conveying air from the blower above, through the centerplates to the traction motors. Lugs for lifting the cab from the trucks, buffer beams with push pole pockets, convenient attachment for couplers, for truck safety chains, etc., and side steps are cast integral.

PRINCIPAL DIMENSIONS AND WEIGHTS OF NEW YORK CENTRAL LOCOMOTIVE

Length over coupler faces	68 ft. 2 in.
Length of each cab	29 ft. 0 in.
Truck centers	16 ft. 0 in.
Spread of third rail shoes	49 ft. 0 in.
Height of floor over rails	5 ft. 4¼ in.
Height of roof over rails	12 ft. 7 5/16 in.
Height of trolley retracted	14 ft. 7 in.
Width over cab sheets	9 ft. 10 in.
Width over all (over eaves)	9 ft. 11⅛ in.
Wheelbase, total (both units)	55 ft. 3 in.
Wheelbase, each unit	24 ft. 3 in.
Wheelbase, truck	8 ft. 3 in.
Weight, total	353,600 lb.
Weight, per axle	44,200 lb.

The truck frame is an integral steel casting and embraces side frames, end frames and transom. The transom is cast hollow, to conduct the air which passes downward through the large centerplate opening to the motors. Lugs for spring nose suspension of the motors are cast on the transom. The cast frame is supported at the middle of each side on a semi-elliptic spring, the ends of which are carried in cast steel spring hangers, swung between two equalizer bars. The equalizer bars are cushion-supported on each journal box by a nest of helical springs, which adds very materially to the good riding of the locomotive. The journal boxes are made of cast steel with brackets projecting from the under side for the support of the third rail shoe beam. The wheels, which are all drivers, have cast steel spoke centers and steel tires. The journals are 7 in. x 14 in.



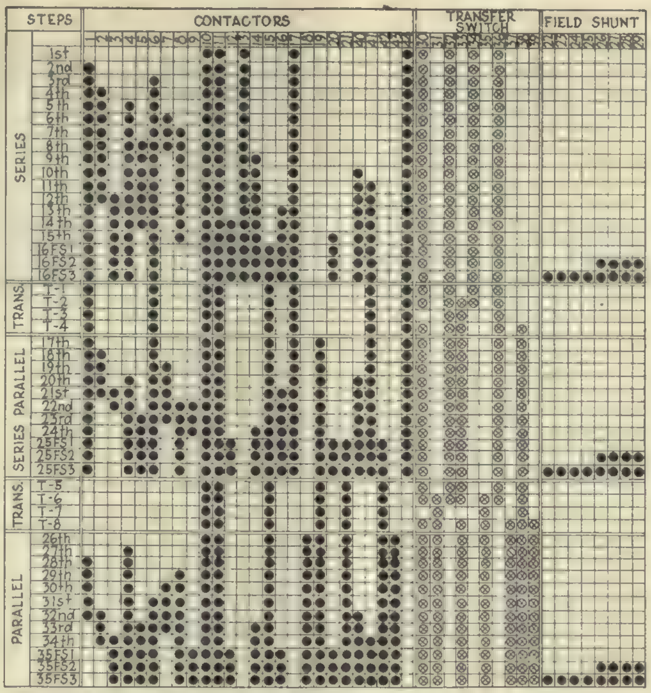
Controller Development and Wiring Diagram of New York Central Road Freight Locomotive, Two of Which Have Just Been Received

Eight traction motors of standard geared railway type, with commutating poles and forced ventilation, are mounted on the axles. The motors are designated as GE-286A and are identical, except for gear ratio, with those used on the Class Q switching electric locomotives. The same type will also be used on the oil-electric locomotives now under construction. The pinion on the armature shaft has twenty teeth and the spring gear on the axle 69 teeth, giving a ratio of 3.45, as compared with 4.235 on the Q locomotive. The motors are insulated for 1,500 volts for possible future use, two in series.

The four motors on each unit are connected in series, series-parallel and parallel, at successive controller positions. At any running position a separate handle on the controller can be moved to either of two positions, known as FS-2 and FS-3, to obtain higher speed by weakening the motor fields by means of inductive shunts.

The GE-286 motor is rated at 415 hp., 575 amp., on the standard one-hour basis, with a temperature rise of 120 deg. C. and a voltage of 600. The continuous rating is 332 hp. at 460 amp. The one-hour rating of the locomotive is 3,320 hp. At 20 per cent adhesion between wheels and rails, based on 170 tons weight, the locomotive develops 68,000 lb. tractive effort. The speeds to which this tractive effort can be exerted at 575 volts are: Series, full field, 4.0 m.p.h.; series parallel, full field, 9.6 m.p.h.; parallel, full field, 20.0 m.p.h.; FS-2, 22.5 m.p.h.; FS-3, 24.8 m.p.h.

Each motor was given a rigid shop test. The resistances of fields and armature were measured. Two motors were coupled mechanically and run for two fifteen-minute periods in each direction, each machine running alternately as motor on rated current and as generator discharging into a water rheostat. Each motor was given a high potential test of 4,000 volts. Sample motors were also run at various loads and voltages to check the characteristics. Commutation was practically sparkless at all loads. Heat runs were made under various conditions, blown and unblown, full and shunted field and voltages running from 300 to 750 volts to check the ratings. The characteristic curves of the motors and the tractive effort curves of the locomotive are shown herewith.



When operating with motors cut out, line contactors come in on 17th notch

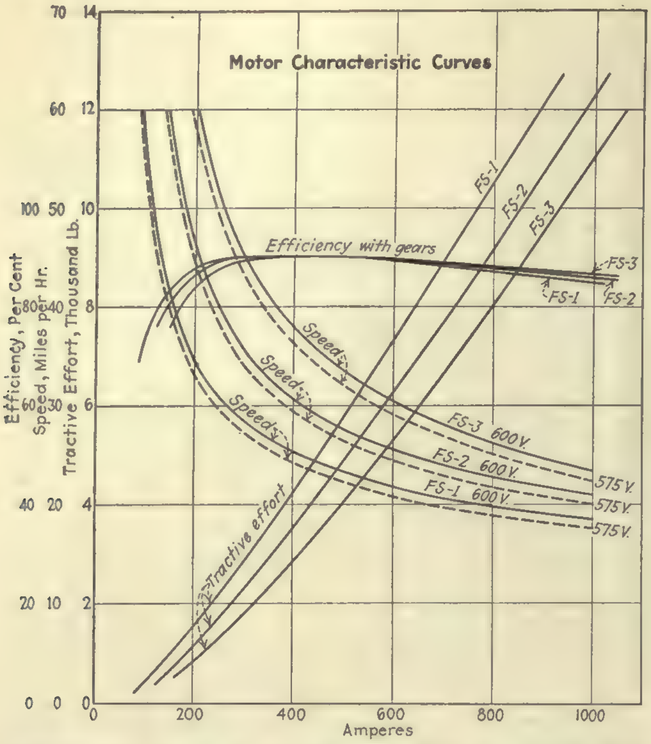
Sequence Diagram Showing Operation of Control and Contactors for New York Central New Road Freight Electric Engine

The cab of each unit is divided by a transverse partition into an operating cab at the outer end and an apparatus space occupying the remainder of the cab. An aisle extends along each side from a door in the partition to a middle door at the other end for communication between units. The blower for the traction motors, the air compressor, hand brake, air brake apparatus, etc., are located on the floor between these aisles. The control apparatus, including contactors, circuit breaker, relays, reverser, series-parallel switch, fuse boxes for auxiliaries, etc., is arranged in two rows in a compartment next to the operating cab and is accessible both from the outer aisles and from a short center aisle opening into the operating cab. The grid rheostats are located just above the floor, below the control apparatus, in this compartment and are ventilated through flues to the roof. The estimated height of the center of gravity is 59 in. above the top of the running rails.

Both units are wired alike except for the battery and battery accessories, as illustrated in the schematic diagrams reproduced herewith.

The control apparatus is of the PCL electro-pneumatic type. The contactors, reversers and series-parallel switches are operated by air cylinders. The air for operating each cylinder is controlled by a magnet valve

One of the Innovations in This Electric Locomotive Is the Cast-Steel Floor Frame Type of Construction. This Eliminates an Expensive Assembly Job Using Structural Shapes and Rivets



Characteristic Curves of the General Electric 286 Motors Rated at 415 Hp. on 575 Volts. Eight Motors on Each Complete Locomotive Are Used, Making the One-Hour Rating of the Engine 3,320 Hp.

energized from the master controller. The series-parallel switch consists of a group of ten contactors operated by a camshaft controlled by four magnet valves. A 32-volt, 150-amp.-hr. storage battery, charged in series with the blowers, is used to furnish current for the motor control circuits, lights and control of all auxiliaries.

All auxiliaries, including pantographs, blowers, compressors and lights, are controlled by push button switches located convenient to each engineer's position.

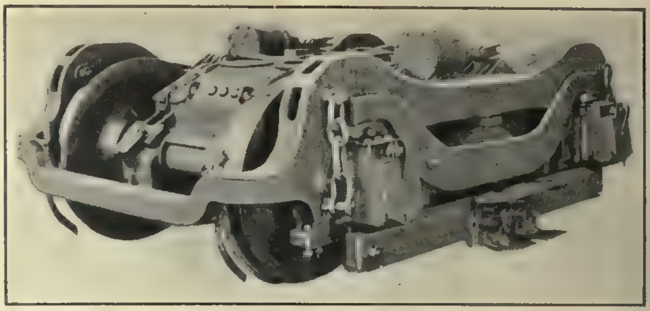
A blower to provide forced ventilation for the traction motors is located on each unit. Also on each unit is a two-stage air compressor, having a displacement of 150 cu.ft. of free air per minute that supplies air for the air brake system, motor control and auxiliaries, including pantographs, whistles, sanders, etc.

Each locomotive is equipped with eight third-rail shoes on each side for operation on the standard New York Central third-rail. In addition four pantographs are provided which will collect current from either the overhead third rail at a height of 15 ft. 3 in. or on the contemplated overhead construction on the west side tracks at a height of 17 ft. 4 in. A bus line between units was not considered necessary.

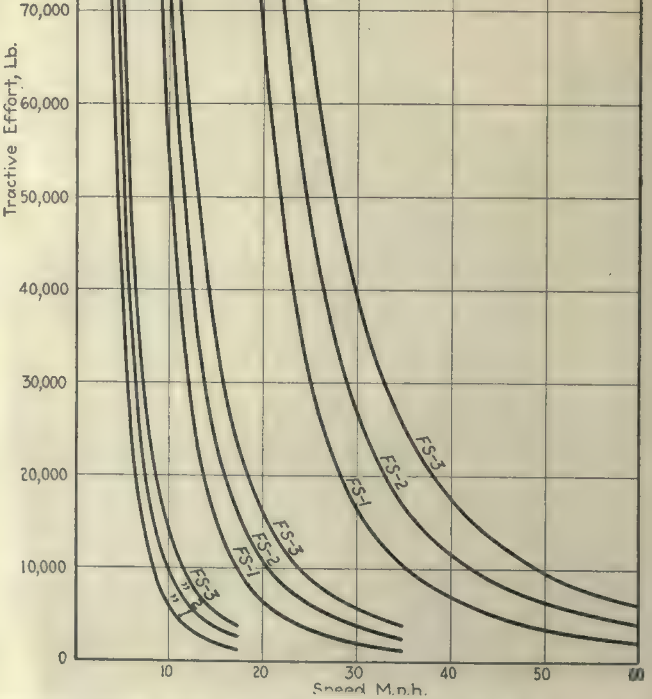
The locomotive is protected from lightning by an aluminum cell lightning arrester. The motor circuits are protected by a high-speed circuit breaker which opens on excessive current and can be tripped by an overload relay in each motor circuit or by a switch placed convenient to the engineman.

The locomotive is capable of operating with a train on a curve of 230-ft. radius and of running at a speed of 60 m.p.h. Under test with special gears this unit has been run at 86 m.p.h. The locomotive is designed to haul a train of 3,000 tons weight, consisting of 75 per

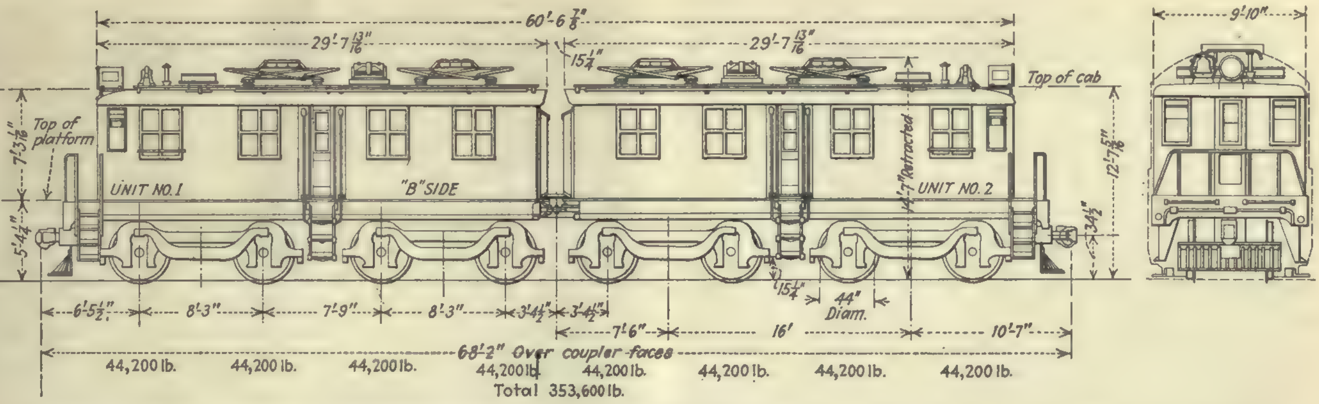
Cast-Steel Truck Frames Ready for Assembly. New York Central Has Just Received Two Road Freight Locomotives Equipped with These Trucks



Cast-Steel Truck Frames Are Used with Two 415-Hp. Motors Mounted on Each. Two Trucks Non-Articulated Comprise a Half Unit of the Locomotive and Two Units and Four Trucks the Complete Assembly



Tractive Effort Curves of New York Central New Road Freight Engines. Nine Running Points Are Provided by Use of Motor Connections and Field Shunts. Under Test One Engine Has Made Speeds of 86 M.p.H. with Special Gears



All Weight Is on Drivers and Evenly Distributed, as Shown in This Drawing of the First of Two New Electric Road Freight Locomotives Recently Received by the New York Central

cent empties and 25 per cent 50-ton loaded cars, at a speed of 32 m.p.h. and with 575 volts at the motors.

The service capacity of the locomotive was defined in the specifications by a requirement that in a continuous series of runs between 79th Street (west side) and Harmon, hauling the train just mentioned, making four intermediate stops of two minutes duration on each trip, accelerating at 20 per cent adhesion and having a layover of twenty minutes at each terminal, with voltage at 575, the temperature rise in the motors should not exceed 140 deg. C. measured by change in resistance or 120 deg. C. by thermometer.

ACCEPTANCE TESTS WELL WITHIN SPECIFICATIONS

An acceptance test of one of these locomotives was run recently to ascertain whether the locomotive conformed to the requirements of the specification. A train of 108 cars, including cabooses, with the proper proportion of loads and empties, weighing 3,006 tons, was assembled. A caboose containing instruments to indicate and record voltage, amperes and speed was coupled to the locomotive and the instruments connected into the locomotive circuits by cables carried temporarily over the roofs. It was intended to run three round trips with this train in about 7½ hours, but due to accidental uncoupling of cars and other operating delays the test was terminated after nine hours, near the end of the second round trip, after making 95 train-miles. The number of stops, exclusive of terminals, was seventeen. The maximum speed was 34½ m.p.h. The amount of energy consumed by this locomotive in hauling the 108-car train under the described test conditions was 26.3 watt-hours per trailing ton-mile.

The maximum motor temperature rise observed was 90 deg. C., which, taking into consideration all the conditions of the test, indicates that the temperature rise would be well within the limit of the 140-deg. requirement in the specification.

Changes in Passenger Traffic in London Since 1913

COMPARISON of the numbers of passengers carried by the rapid transit lines, buses and tramways of Greater London in 1913 and 1925 discloses an interesting change in the relative importance of these three modes of transport. The volume of traffic carried by each of the three has greatly increased during the interval of twelve years, but the growth has been uneven and the buses and rapid transit lines have overtaken the tramways, which in 1913 occupied the first place.

	Passengers Carried	Per Cent of Total	Rides per Capitum
Tramways, 1913	812,000,000	36	110
Tramways, 1925	979,000,000	27	128
Buses, 1913	736,000,000	32	100
Buses, 1925	1,671,000,000	45	218
Rapid transit lines, 1913	725,000,000	32	98
Rapid transit lines, 1925	1,049,000,000	28	137

From 1913 to 1925 the total volume of traffic increased by 63 per cent, but the tramway passengers increased only 21 per cent. The bus passengers increased by the phenomenal figure of 127 per cent, while the rapid transit passengers increased by 45 per cent. The result has been that the tramways have fallen to the bottom of the table while the buses have risen to the top. Meantime the rapid transit lines advanced to the second place.

Side View of the New Electric Engine That Will Haul 3,000 Tons of Freight Consisting of 100 Cars Between Harmon and New York City

Educational Opportunities for Philadelphia Employees

MANAGEMENT representatives of the Philadelphia Rapid Transit Company, Philadelphia, Pa., will devote much time this fall and winter to educational courses designed to give to P.R.T. employees opportunity for a broader understanding of the principles underlying the co-ordinated transportation system and its varied activities. The courses are under the direction of men who are not only versed in the theories of their subjects but in their practical application as well.

Courses 1 and 2 at the William Penn High School are open to all. Courses 3, 4 and 5, applying more specifically to P.R.T., are held entirely under P.R.T. auspices at company locations.

1. *Public Relations with a Background or Transportation and Public Utility Economics—J. M. Shaw.* Held at William Penn Evening High School, Fifteenth and Wallace Streets, 7:30 to 9:30 p.m., Tuesday evenings, from Sept. 14 to Dec. 14, inclusive. Topics will include:

1. Origin and development of co-ordinated transportation as a public service.
2. Owner, manager, worker, consumer — four wheels whose alignment is necessary to progress.
3. Monopoly vs. competition.
4. Relation of fares to service.
5. Production and participation—the heart of the industry.
6. The new science of public relations.
7. Developing public contacts.
8. Service as a molder of public opinion.
9. Public ownership of public utility securities.
10. The technique of complaint adjustment.
11. The newspaper.
12. Some advertising mediums for a co-ordinated transportation system.
13. General review.

2. *Handling Men—E. J. Benge.* Held at William Penn Evening High School, Fifteenth and Wallace Streets, 7: 30 to 9: 30 p.m., Monday evenings, from Sept. 13 to Dec. 13, inclusive. Topics will include:

1. The problem of handling men.
2. Stimulating subordinates.
3. Control.
4. Discipline.
5. Appeals for better work.
6. Rivalry and other incentives.
7. The force of habit.
8. Training insures careful work.
9. The supervisor's job.
10. Difficulties with subordinates.
11. Combating negative traits.
12. Difficulty with superiors.
13. Responsibility and authority.

3. *Electric Railway Industry*—Held at Luzerne Auditorium, 7: 30 to 9: 30 p.m., Thursday evenings, from Oct. 7 to Jan. 6, inclusive.

1. Development of street railway industry, W. K. Myers.
2. Public relations, J. M. Shaw.
3. Importance of employees in public utilities, A. A. Mitten.
4. Transportation and traffic, W. J. Beadle.
5. Generation and distribution of power, H. G. Werner.
6. Maintenance of equipment, G. H. Stier.
7. Construction and maintenance of way, J. H. M. Andrews.
8. Materials, W. E. Scott.
9. Finance and accounting, C. E. Ebert.
10. Legal, C. J. Joyce.
11. Claims, J. J. K. Caskie.
12. The motor bus, J. A. Queeney.
13. General discussion, J. E. Whiting.

4. *Supervisory Problems—Messrs. Andrews and Beadle.*—A discussion group open only to superintendents, foremen, supervisors, department heads and others in equivalent positions. Held at 1520 Spruce Street from 7:30 to 9:30 p.m. on alternate Wednesday evenings. Six meetings: Sept. 22, Oct. 6, 20, Nov. 3, 17, and Dec. 1.

5. *Public Speaking and Parliamentary Procedure—Mr. Holt.*—A practical group consisting of ten meetings at Luzerne Auditorium, 7: 30 to 9: 30 p.m., Monday evenings, from Sept. 20 to Nov. 22.

Express Station Converted Into a Garage

SEVERAL years ago the Union Street Railway, New Bedford, discontinued its electric express business when connecting trolley lines leading to two of the principal shipping points, Boston and Providence, were discontinued. The general increase of motor trucking also proved to be too great a competitor. A centrally located modern freight station, representing a large investment, then yielded no income.

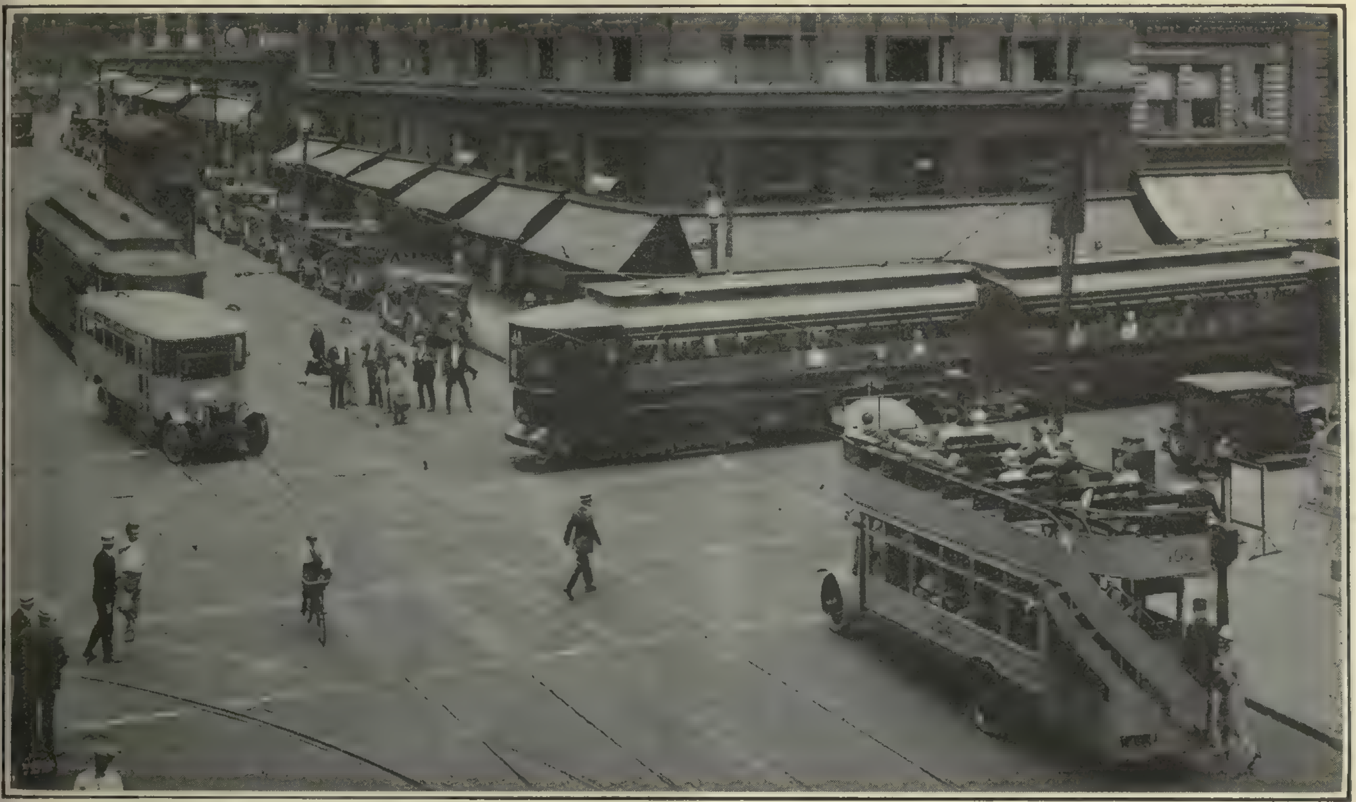
With the establishment of the motor coach service by the railway a garage where the coaches could be suitably housed and repaired had to be provided. As this express station was located less than ¼ mile from the New Bedford terminal of the New Bedford-Fall River-Providence motor coach line, it was considered an excellent location for a garage. Little remodeling of the building was necessary. As about two-thirds of this building had been previously leased to a local distributing agency, only the remaining third was converted into a garage. Should the company deem it advisable to increase motor coach operation at any time the remaining part of the building can be remodeled as a garage extension.

Union Street Railway Now Uses This Former Freight Station to House Twelve Buses

Reconstruction consisted mainly of installing garage doors, laying a concrete floor with safety bumpers, providing a washing and draining system and piping and wiring for heat and light. Air pumps, machines and benches were also systematically installed. The office at the end of the building was converted into a combination office and stock room.

Railway Information Published in Cincinnati Telephone Directory

IN CINCINNATI, OHIO, a city and suburban telephone directory is no longer complete without information on the street railway companies. The summer, 1926, classified directory, with valuable information of the railway and bus routes of the Cincinnati Street Railway is proof of this innovation. A full page map shows the co-ordinated service as of April 1 and a second page contains data on car lines, route numbers, fares and transfers, as well as diagrams of boarding and alighting points. For the resident of the city of Cincinnati this directory will be helpful, but for the strangers in the city it will serve as an invaluable guide.



This View Shows an Articulated Car, a Single Car, a Single-Deck Bus, a Double-Deck Bus with Open Top and a Double-Deck Bus with Closed Top, All About to Make the Crossing at Sun Square, One of the Oldest and Busiest Cross Roads of Baltimore

Baltimore in Campaign to Increase Traffic

Many Notable Improvements, Including the Addition of Modern Rolling Stock and Methods for Making Higher Schedule Speed, Have Won Increased Patronage—The Company Has Also Actively Participated in Civic Movements to Improve Street Conditions

LOCAL public carrier transportation is sometimes called a monopoly, but the United Railways & Electric Company of Baltimore realizes that the modern story of a street railway is a story of competition. It believes that only by popularizing the service and making the public realize the necessity for favorable operating conditions can an electric railway do its full share in local transportation.

During 1924 and the early part of 1925 the company suffered a decrease in revenue passengers carried, as compared with the previous year, and while changes in zones made this decrease appear greater than it really was, predictions were not wanting from persons hostile to the company that street cars were becoming obsolete and that Baltimore's mass transportation would be handled before long entirely by buses.

Today the situation is quite different. Since January, 1926, both gross revenue and revenue passengers have not only exceeded the figures for 1925 but those for 1924, before the changes in zones already mentioned were made. March, April and May were the most profitable months the company had had since 1920, the peak year in the street railway industry in the country. For the six months ended June 30, 1926, revenues increased 2.5 per cent over a corresponding period for 1925 and revenue passengers increased 3.6 per cent. What is equally, if not more, important, suggestions in the daily newspapers that street cars are out of date have disappeared, and the public attitude toward the company has greatly changed. The most important factors, in the opinion of the company, for this change are:

1. Open and vigorous advocacy by the company of the interests of the car riders of Baltimore in all traffic discussions.

2. Proof by the company of its sincerity in this advocacy by actual diligent attention to the car rider's comfort and convenience when on the cars or buses; in short, painstaking service.

3. Getting rid of old-fashioned cars and substituting bigger and better ones, substantially increasing bus

operations, practical and successful work on the rush hour problem; in brief, "new service for old."

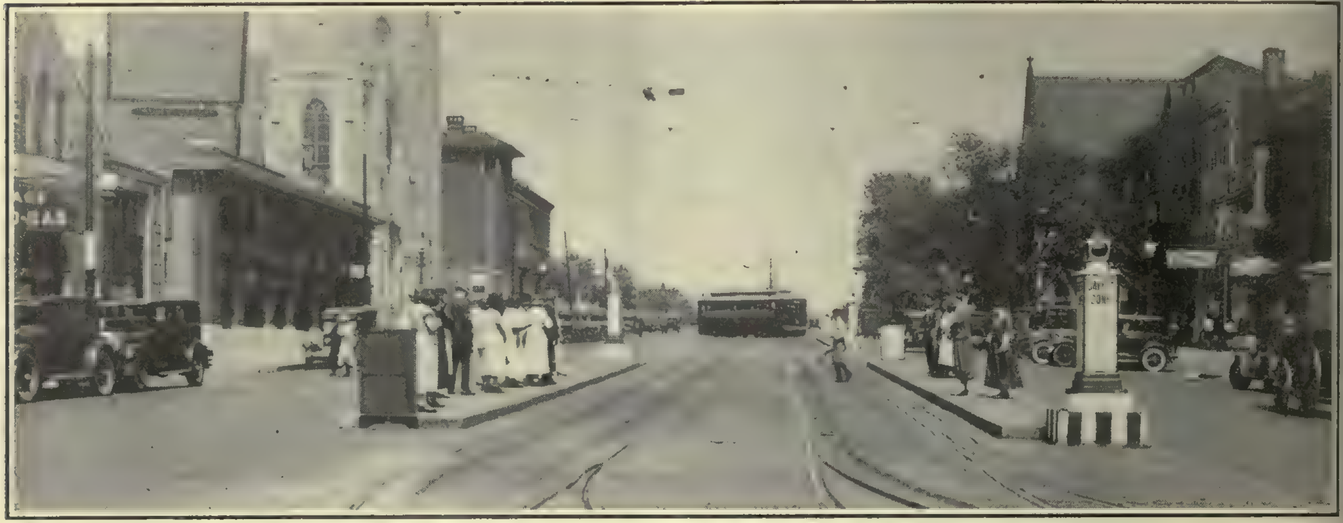
4. Frankly selling this service in the open market against competition by newspaper advertising on a large scale.

5. A definite policy of self-criticism and consistent co-operation with public criticism for the good of the service.

6. Constant reiteration to the public of the principle that the good street car system, properly augmented by buses, cannot be improved upon for public transportation; earnest efforts to prove this by service, and publication of the proof whenever possible.

7. More than ordinary eagerness to co-operate with the Baltimore people and groups—to be a part of the life of the city — to put the whole car system on the side of sound movements involving the general public welfare.

Some steps in this campaign, such as the advertising campaign, which was distinguished by a series of very striking full-page advertisements in the Baltimore local papers, have been described in the ELECTRIC RAILWAY JOURNAL, as in the issue of March 27, 1926, page 551. This article touches briefly on other steps in the program, as mentioned in the company's brief in the Coffin award contest.



Some of the Streets in Baltimore Are Equipped with Raised Platforms. The Entering End of the Platform Is Protected with a Safety-Zone Light Post, with Conspicuously Marked Base, and the Leaving End with a Substantial Frame Containing a Safety Poster. This View Is on North Charles Street

SUPPORTING THE INTERESTS OF THE CAR RIDERS AND PUBLIC POSITION OF THE RAILWAY

This is the first factor mentioned in the list and is perhaps best illustrated by action taken on the conclusions given by Kelker, De Leuw & Company in a traffic survey report for Baltimore made by them during the early part of 1926. One of the recommendations in this survey was the elimination of parking, both partial and complete, in congested districts. This conclusion was attacked by the traffic committee of the Baltimore Association of Commerce, which was composed of business men and industrial interests and included a representative of the railway. The majority report of the committee opposed prohibition of parking on the ground that customers of the local stores used automobiles in their shopping trips rather than the railway. The representative of the railway presented a minority report, pointing out that the merchants would oppose their own interests if they adopted the majority report, since most of the shoppers shopped by street cars, and speedier street car service was more necessary than the right to park automobiles indiscriminately.

To prove this contention, the company arranged to make a check of the customers arriving at three prominent downtown stores—one of the largest department stores in the city and two smaller stores. This check showed clearly that for three days less than 5 per cent of the customers of the big department store came by automobile, and on one day the percentage was only a little more than 3 per cent. The result of this survey and other data which the company was able to offer was that the board of directors of the Association of Commerce voted unanimously to reject the report of its own traffic committee and to support the recommendations of the traffic survey as far as possible.

INCREASED EFFICIENCY IN OPERATION

This is the factor mentioned second in the list given. It is obvious that the company's success in gaining public good will in Baltimore would not have been possible without, first, proof of its sincerity in advocacy of the car riders' rights by substantial improvement of its service and, second, frank and vigorous efforts to sell this service in the open market against competition. Proof of improvement in the service is shown by the fact that since September, 1925, a total of 95 more or less obsolete cars have been dropped from the company's equipment, and as a result of an intensive car construction program, coupled with a scientific study of each of the company's 36 lines, there have been:

1. Substitution on one important line of cars seating 47 passengers for cars seating 36 passengers.

2. Substitution of 36-seated cars for 30-seated cars on two important lines.

3. Doubling of the number of 60-passenger trail cars on one important line.

4. Adoption of a system of interline operation during rush hours which the company believes to be unique, resulting in ability to make double use of many cars when most needed, less crowding of riders during peak periods, greater frequency of service, decreases in deadhead or "light" mileage and increases in receipts per car-mile.

5. Increases in speed on many lines.

6. Adoption of express service on suburban lines, materially reducing the difficulties presented by requirements for long and short haul service on the same line.

7. Completion of 26 articulated two-car, three-truck trains, a boon during peak hours, since they double the capacity of the lines on which they operate, and are a popular improvement with riders.

8. Greater use and increase in the number of permanently coupled two-car trains, which have proved invaluable, especially for heavy movements to and from places and events that attract crowds.

Of the 95 cars dropped as obsolete, 87 were single-truck closed cars, seating 30 passengers each; one was a single-truck convertible car, seating 28 passengers, and seven were single-truck one-man cars, seating 22 passengers each. In all cases the substitution of bigger cars for smaller ones meant semi-convertible cars with cross seats in place of double-truck closed cars with longitudinal seats. One line on which this was done runs through a territory largely occupied by automobile owners, and the old cars did not attract them, while the new ones did. In the first five months of 1926 this line showed an increase in earnings of 7 per cent over the corresponding period in 1925.

HOW GREATER SPEED HAS BEEN OBTAINED

The adoption of the recommendations in the traffic survey will help to increase the speed of both street cars and automobiles in Baltimore. In the meantime the company has introduced several other changes which help in this direction.

Its service includes that by both single cars and two-car trains, but it was found that during the rush hours the two-car trains, whether made up of motor car and trailer or multiple-unit cars, were slower than the single cars because of the larger number of stops made to receive and discharge passengers. In consequence, a skip-stop plan for these trains was put in effect during rush hours so that the two-car trains were at once put on an equal footing, as regards schedule speed, with the single cars. Decreases in running time resulted, the amount saved on one line between the center of the city and the line's northeastern terminus, a distance of approximately 6 miles, being six minutes. The adoption of the plan only during rush hours seemed to avoid many of the objections to the old-fashioned plan of "skip - stop." In fact, so successful was the change that beginning June 1, 1926, the company has used its "limited stop" plan on three other lines, whose operation was not complicated with the mixture of two-car trains and single cars. In these cases, stops are skipped during rush hours only. Stop poles in Baltimore carry a white circle, as is usual, to identify them, and under the new plan the poles not used during rush hours have a distinctive marking to distinguish them from those where stops are made at all hours.

SEQUEL TO THE TRAFFIC SURVEY

It might be appropriate here to mention briefly the sequel of the extended traffic survey, completed last March and published in abstract in the ELECTRIC RAILWAY JOURNAL for May 22 and May 29, 1926. The opposition against the parking recommendation in this survey, brought by the traffic committee of the Baltimore Association of Commerce, has already been mentioned, but, as explained, this opposition later was withdrawn. Other opposition developed to certain of the rerouting recommendations, and the recommendations as a whole are now being considered by the Public Service Commission. The company is helping to assist in the adoption of the improvements recommended in the survey by stressing its willingness to bear the initial cost of changes in its track required, by the supply of pertinent data and in other ways.

CAR FARE CARRIERS IMPROVE SPEED

A small but effective step which has resulted in improving an increasing car speed is the issue of a small metal container to hold the tokens used for fare in Baltimore. These containers have a capacity of fourteen tokens each and are sold with thirteen tokens for $1. They cost the company 4 cents each, and since the token fare is 7½ cents, their price to the public under this plan is 2½ cents. The carriers are well advertised and their help in speeding up the boarding of passengers is considerable. It is expected that this effect will be even more marked as the distribution of carriers increases.

The number of banks, business houses and stores at

Neat Waiting Stations Have Been Erected for Passengers on Suburban Lines

which tokens are sold has been increased. There has also been an increase in the number of uniformed men stationed at busy loading corners, theaters, baseball parks and railroad depots, who offer car checks for sale to riders before they board the cars.

CHANGES IN TRANSFER METHODS

Two other methods for increasing the speed of cars adopted during the past year are the elimination of the rule that junction points must be punched on transfers during rush hours and allowing transfer passengers to board their cars at either front or rear doors. When presented at the front doors motormen accept the transfers. Since conductors have ceased to punch junction points on transfers issued during rush hours and have been relieved of much transfer collection, they have been able to shorten the length of passenger stop.

Another gain in speed has been secured by establishing express service on some of the long suburban lines, namely, cars which do not stop on the outbound trip until a certain point has been reached except to receive passengers or inbound beyond a certain point except to discharge passengers. Still another type of "express" service inaugurated last year is known as the "two-fares-as-you-enter" plan on a line that carries many riders well into the second fare zone in the country. On these cars all riders pay both the city fare and the first country fare on entering. This automatically excludes all city riders and leaves these cars to the homegoing suburbanites.

ARTICULATED CARS FOR RUSH-HOUR SERVICE

One of the most popular improvements in the equipment adopted by the company recently is the articulated car—a two-car, three-truck train, motorized throughout. Fourteen cars of this type were constructed during the past year, making a total of 26 now in service, and six more were being built at the company's shop and were to be ready for service in September. Each articuated car seats 87 persons and an account of it, as well as of the multiple-unit train of the company, appeared in the ELECTRIC RAILWAY JOURNAL for April 11, 1925.

The articulated car is operated as a single "pay-as-you-pass" unit, the conductor standing at the front end of the rear half of the unit where he controls all exit doors.

These cars are operated during rush hours on two very heavy traffic lines, and as the schedules on these lines at the extreme peak call for a 3 to 1 ratio or more, there is no waste of cars. The practice followed is for the base crews on certain single cars used during the day to change to the articulated cars as they pass the operating carhouse. This essentially doubles the capacity of the line with no increase in platform men. The single cars turned in by the base crews are then used by the tripper crews, tripling the capacity of the line.

Steam and Electrics Co-operate in Indiana

FREIGHT shipments, both carload and less than carload, are being handled by the Union Traction Company of Indiana between all points on its line and all points on steam railroads south of Louisville, Ky., and the Ohio River, according to F. D. Norviel, general passenger and freight agent for the company. He stated that this means that shipments might be routed by electric railway and reach their destination in from one to four days less time than by an all-steam routing. An example of the fast transit afforded by the interurban line occurred recently when a shipment from Indianapolis was only four days in transit to Atlanta, Ga. According to Mr. Norviel, the electric railway handling to Louisville greatly expedites freight movements between Indiana and the Southern states.

Bus Legislation in Victoria, Australia, Proves Effective

JUST as almost everywhere throughout the world, the arrival of the motor bus in Australia was followed by a weed-like growth and attempts to encroach upon established rail services in preference to developing new areas. In the case of the Melbourne & Metropolitan Tramways Board, the management had been forewarned by its close knowledge of bus and jitney operations in Great Britain and America. Hence less than two years elapsed before effective legislation was secured.

In December, 1923, during the fiscal year ended June 30, 1924, when the board reported losses from wildcat buses, it also secured the right to operate motor buses for "aiding or relieving" traffic on the tramways, in addition to the original right of operating motor buses for "stimulating or developing the traffic of any tramways." This change gave the board the opportunity to discourage wildcat operators and also to start services other than those of the thankless pioneering kind.

At that time the maximum license fee for a bus was about £10; buses paid no road maintenance charges; buses could run over tramway-maintained paving if they chose; nor were they subject to the wage and working conditions imposed on the board as a tramway operator.

These inequalities have been wiped out to a degree by Act 3378 of Dec. 30, 1924, and Act 3439 of Dec. 31, 1925. Buses are now required to pay an average fee of £3 10s. (approximately $17) per seat per annum, yielding about £115 (approximately $558) from a 33-seater. This money goes into the "Metropolitan Roads Fund" for the "Metropolitan Area," which means the city of Melbourne and the vicinity within 8 miles from the corporate limits.

Buses may ply only on routes which are approved by the Minister of Public Works. Such routes are not granted where he considers that adequate tramway or railway facilities exist, or where the roads cannot withstand motor bus traffic. Before deciding upon an application the route is reported upon by an advisory committee of five members, representing the railways, the tramways, the municipalities, the provincial government and the bus proprietors.

The board now operates 56 buses, including those which are used while cable routes are being electrified. Such temporary operation in a wildcat bus territory was inaugurated on Jan. 3, 1925, from the first fleet of 45 buses. These buses pay the prescribed taxation just like those owned by private operators.

By July, 1926, there were only 80 privately owned buses. These compete with the tramways and railways to a very small extent. As the cost of maintaining these buses is increasing, no new ones are being put on the roads. With the present high cost of bus operation and maintenance and the rather strict regulations now in force, it seems certain that in the future the use of the bus in Victoria will be confined to routes and service for which it is especially adapted.

Latest Type Open Car of the Honolulu Rapid Transit Company with Center Aisle Has a Seating Capacity of 56

Railway Prospects Bright in Honolulu

Earnings Are Good and the Operating Ratio Is Low in the Metropolis of the Mid-Pacific—Buses Are Used as Feeders to the Rail Lines—System Dates Back to Grant from the Kingdom of Hawaii

By A. E. Kirk
Assistant Manager Honolulu Rapid Transit Company

IN HONOLULU all classes of the population are street car riders. It is not unusual to see a car carrying Americans, Hawaiians, Japanese, Chinese, Portuguese, Filipinos, Koreans and negroes. No racial distinctions are made, and the various nationalities travel together without friction. Transportation service in this thriving city of 105,000 people is rendered by the Honolulu Rapid Transit Company, which operates some 35 miles of electric railway track and 6.5 miles of bus line. In almost every year since its organization the company has been able to pay its stockholders an 8 per cent dividend.

In 1894 the Hawaiian Tramways Company began operation of a horse car system under a franchise granted by the Kingdom of Hawaii. The horse cars were operated on headways of 20 and 30 minutes, which at that time were deemed sufficient. No effort was made to increase the service as the city grew, and in a short time people began to demand some faster and better means of transportation. In 1898 the Legislature granted a franchise to the Honolulu Rapid Transit & Land Company, which began operation of electric cars on Aug. 31, 1901. As the horse car company had rights for the use of all the more important streets, the Rapid Transit Company in 1903 bought out the franchises, property and other interests of the Hawaiian Tramways for $300,000.

Ever since the purchase the company has endeavored to keep pace with the growing community. In 1923 a large improvement program was undertaken. The lines to Waikiki Beach, Kaimuki, Fort Shafter and on Lilliha Street were double tracked, using 122-lb. grooved girder rail. This has made it possible to give better service on these lines and has enabled the company to handle large crowds very expeditiously.

Four years ago the company's name was changed to the Honolulu Rapid Transit Company. A new franchise placed it under jurisdiction of the Public Utilities Commission of Hawaii. Appeals from the decisions of the commission, however, may be taken to the territorial courts. The property was valued at $3,219,000 and capitalized at $2,500,000, all common stock, every share of which is owned in the territory. A return of 8 per cent is allowed by the commission, and until 1924 this was paid regularly. In that year 3 per cent was paid, and in 1925 the dividend was 7 per cent. The Legislature of 1925 abolished the former 2½ per cent tax on gross revenue for a period of four years, with the proviso that an increase in the dividend rate will automatically restore the tax.

Prior to October, 1924, the fare was 5 cents cash and 2½ cents for school children. After the valuation referred to in the preceding paragraph the rate was increased to 7 cents cash, 6¼ cents token, and 3⅓ cents for

Connecting Point of the Kalihi Bus Line and the Fort Shafter Street Car Line

school children. The average fare is now 6.09 cents per revenue passenger. Earnings of the system are 42.28 cents per car-mile, and expenses are 27.72 cents, making the operating ratio 65.55 per cent.

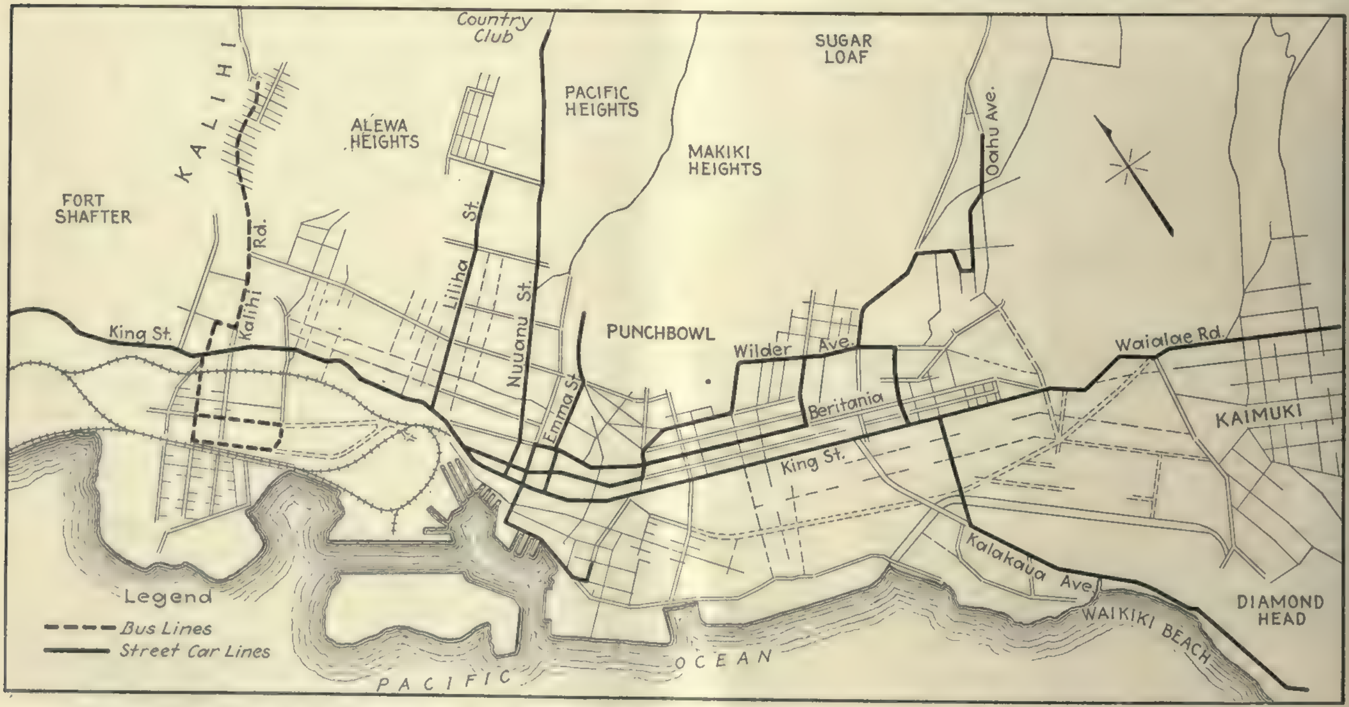
Railway equipment of the Honolulu Rapid Transit Company consists of 71 cars, of which six are semiclosed pay-as-you-enter type, and the remainder are open cars with center aisles, having an average seating capacity of 56. One-man operation is already in effect on one line, and it is expected that this will soon be extended to about half of the system. Bids have been asked for on twelve one-man two-man cars.

For six months in 1915 the company attempted bus operation, but was forced to give it up because of the poor condition of the roads. Packard buses were used at that time. In 1923 bus operation was resumed with Federal buses. Later, a Reo bus was added.

Bus operation was undertaken primarily to give service to outlying districts not reached by the car lines. In 1925 this feeder service netted a profit of $88. The company has carefully considered the bus question and does not contemplate the substitution of buses in place of cars. Future extensions, however, will probably be made with buses, and the feasibility of sightseeing tours is being studied.

Serious operating difficulties are met in some places, as the streets are so narrow that an automobile cannot pass between a parked vehicle and a street car where there is double track. The average schedule speed of cars is 10 m.p.h. and that of the buses 12 m.p.h. The bus operation, however, is outside of the congested district.

Automobiles, of which there are 17,000 in the city of Honolulu alone, have made considerable inroads in the revenue. The number of passengers carried in 1925 was 17.607,737, a decrease of 2,200,000 from the num-



Transportation Needs of Honolulu Are Well Served by 35 Miles of Electric Railway Track and 6.5 Miles of Bus Route ber carried in 1924. The first half of 1926 showed a further decrease. Traffic checks show an average of 1.98 passengers per automobile during rush hours, while the street cars average about 70 passengers. The management believes that the low ebb of traffic has been reached and that an increase may be expected in the near future.

Energetic methods are used by the company to encourage riding. Attractive advertising folders have been prepared and placed on all steamers touching at Honolulu as well as in the tourist hotels. The pamphlets point out the advantages of the street car in reaching various points of interest. When the United States fleet was in port in 1925, more than 20,000 folders were distributed to the sailors. Concessions are made for the convenience of tourists. For example, on days when Canadian Pacific steamships are in port, the company accepts Canadian money at par.

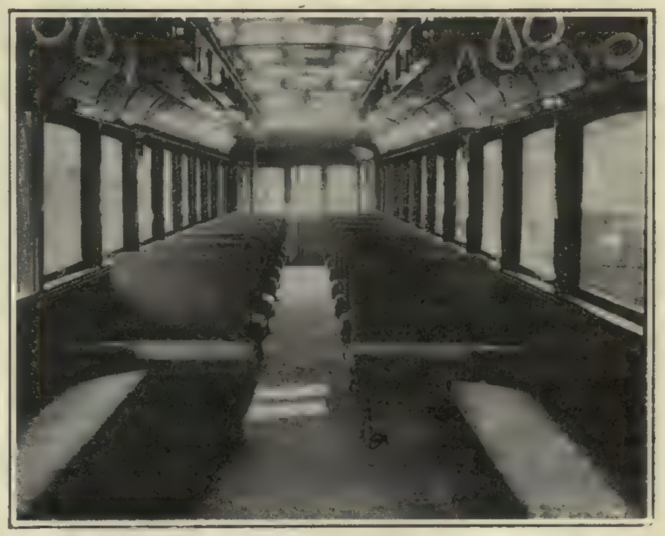
In spite of the large number of automobiles, and the fact that much of the equipment is of the open running board type, the Honolulu Rapid Transit Company has one of the lowest claims and damage ratios in the United States. The amount paid in 1925 was only 1.68 per cent of the gross income. This is the highest it has ever been and may be attributed to the increasing street congestion.

The company has enjoyed remarkable freedom from labor difficulties, in spite of the fact that the employees belong to a wide variety of races, including Americans, Hawaiians, Hawaiian-Chinese, Portuguese and Hawaiian-Japanese. All employees are covered by group life insurance to a maximum of $2,000. Disputes are settled by an employees' council, composed of nine employees from all departments, elected yearly. The employees have a benefit association, to which the company regularly donates substantial sums.

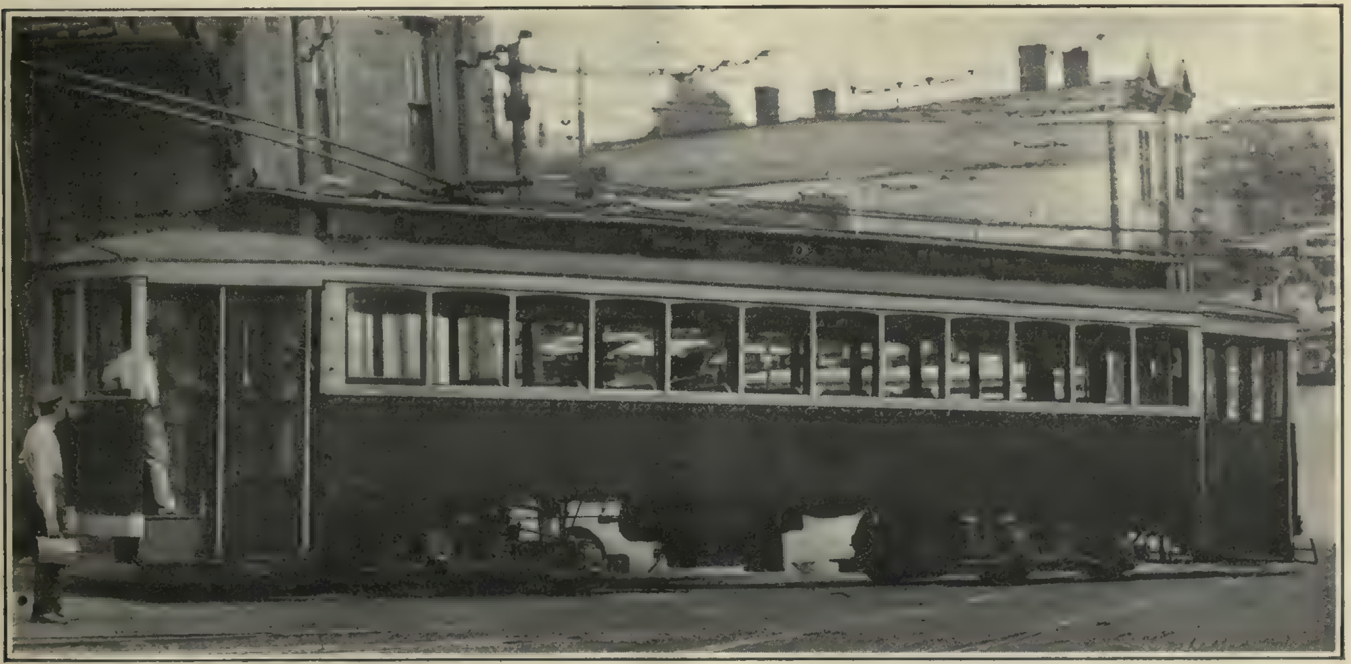
Gratifying evidence of the sound condition of the property is found in a recent report by Richard Sachse and Bruce W. Campbell, consulting engineers, Los Angeles, who made an extensive survey of the system. Their investigations showed a relatively high operating efficiency and a sound and satisfactory financial condition.

Cincinnati Rebuilds Cars for One-Man Operation

AUTOMATIC treadle exits at both front and rear ends are features of a group of single-end cars recently rebuilt by the Cincinnati Street Railway for use on Route 43, operating between the Central Union Railroad Station and the hotel and business district. Full safety and interlocking devices have been installed. Other improvements include electric heaters, window wipers and a new lighting system. The latter consists of twenty frosted lamps so wired that each is independent of the others. Seats are attractively upholstered in washable suede.


Seats of the Rebuilt Car Have Been Upholstered in Washable Suede

Outside the cars are finished in the new standard colors of this company—burning brush orange below the belt rail and locust cream above, applied by the Duco spray process. Bumpers are made of single pieces of pressed steel, and the rear bumper is painted with aluminum for the express purpose of giving increased visibility.


Single-End Car of Cincinnati Street Railway Equipped with Automatic Treadle Exits at Both Ends

Prominent Executives Commend the New Spiri
Annual Convention Issue o

THE Annual Convention Issue of ELECTRIC RAILWAY JOURNAL, dated Sept. 25, was entirely devoted to the subject of "Making Transportation Pay." Most of the articles in this issue were written by executives in charge of the operations on properties which have demonstrated by actual experience the effectiveness of modern equipment and modern methods in winning back patronage through improved service, while at the same time reducing operating costs.

That these operators, who contributed their valuable time to giving the industry the results of their experiences, have made a noteworthy contribution to the advancement of local transportation is evidenced by the many letters received from railway executives in this country and Canada. Space permits only the publication of extracts from these comments.

Harry Reid, president Interstate Public Service Company, writes as follows:

I have read the Annual Convention Issue of ELECTRIC RAILWAY JOURNAL with a great deal of interest and find it contains much advance and comparative news, showing much time and thought had been given to editing.

The articles are varied and interesting. The advertisements are not only attractive but full of up-to-date knowledge. I surely congratulate you upon this issue, and not only this issue but all issues.

From **F. G. Buffe**, vice-president Kansas City Public Service Company, came this letter:

Please accept my hearty congratulations on the excellent Convention Number of the JOURNAL.

Inasmuch as I was unable to attend the convention, it was doubly interesting to me. The advertising pages were exceptionally interesting, and I do not believe I ever saw a better prepared and more attractively designed and printed advertising section in any magazine.

T. H. Tutwiler, president the Memphis Street Railway, comments in part as follows:

It is a pleasure to me to acknowledge the valuable contribution and stimulus to the electric railway industry which your Convention Issue of Sept 25 supplies.

In reading the several pages of editorial matter, as well as the various articles of the issue dwelling upon the value of proper equipment as agencies for promoting street railway traffic, my impulse is quickened by the thought that we should strive the more zealously to make street car riding more attractive; and that, with lines and rolling stock thoroughly modernized, we should seek to merchandise our service through intelligent sales effort.

"Surely," as your opening editorial states, "the road opens ahead" for us; and we of the industry who are so vitally concerned with its success and progress have reason to feel encouraged that the gloomy clouds which have overshadowed our business during the past five years or so are breaking away, and the dawn of a brighter day seems to be at hand.

Your very worthy journal has been a distinct agency in bringing to the attention of executives throughout the industry the facts upon which more successful operation may be based, and the means by which policies looking to that end may be carried out. Every good wish for your continued success is heartily extended.

Arthur W. Brady, receiver Union Traction Company of Indiana, had this to say in part:

I have carefully examined the Convention number of the JOURNAL, just received. It is an unusually valuable one, dealing as fully as it does with what is being done throughout the country to make travel by electric railroad more inviting and at the same time to reduce costs and improve service. The industry is indebted to the JOURNAL for having so thoroughly covered the field.

C. D. Emmons, president the United Railways & Electric Company of Baltimore, says:

I wish to congratulate you on the Annual Convention Number of the ELECTRIC RAILWAY JOURNAL, which I have looked over from cover to cover and find much of interest, not only in the reading matter but in the advertising matter itself. It is a most attractive publication and you are entitled to great credit for it.

A letter from **J. K. Punderford**, president and general manager the Connecticut Company, reads in part:

This issue is particularly useful and informative both in the articles and advertising showing the trend. The JOURNAL staff deserves much credit for its contribution to the industry through this useful publication.

D. W. Pontius, vice-president and general manager Pacific Electric Railway, made this comment in his letter:

There is a great deal of interest to the industry in each issue of your publication, and it appears that the Convention Number contains some particularly good material.

I am unable to offer any suggestion which would be of any assistance in making the JOURNAL a better paper, because my judgment is that you are now furnishing a first-class, up-to-date publication.

F. D. Burpee, vice-president and manager the Ottawa Electric Railway, Ottawa, Canada, writes in part:

I have thoroughly enjoyed the Convention Number of the ELECTRIC RAILWAY JOURNAL. I have taken great pleasure in showing it to several of my friends who have dropped into my office, as an example of how well the street railway industry is looked after by its technical press. I particularly enjoyed the advertising matter. In fact, I am at a loss to suggest any means by which the Convention Number could have been improved. Please accept my sincere congratulations. I am sure I am only one of thousands of street railway men who find the JOURNAL a constant help in their every-day work.

A letter from **H. J. Sheeran**, president New York Railways Corporation, contains this comment:

To my mind this issue is the best and most comprehensive number ever published of this extremely interesting and efficient magazine. The articles, without exception, are splendidly written and well illustrated. That entitled "Surely the Road Opens Ahead" is most encouraging to those of us who have been confronted with varying degrees of adversity in recent years.

We are particularly interested also, at this time, in the comment on better results obtained through the use of up-to-date equipment, as well as in the news pertaining to buses.

Calvin A. Owens, president Florida Interurban Rapid Transit Railway, has this to say about the issue:

Permit me to congratulate you on your latest Annual Convention Issue of the ELECTRIC RAILWAY JOURNAL, which is a real contribution to the industry.

It is unfortunate that in the present era of prosperity constructive organizers are compelled to devote their attention to the subject of "Making Transportation Pay." Your splendid handling of the problem is set forth in a very interesting manner and I have no thought or criticism to add in any connection. I think you are to be congratulated in the amount of support you have secured from the advertisers, as most of their copy is enlightening to the reader, regardless of it being paid space.

f the Industry Reflected in the
e JOURNAL

A. R. Myers, president Erie Railways, writes as follows:

A copy of the Convention Issue has just come to my attention, and after a hurried perusal I can have nothing but praise for the efforts you have put forth, and the results obtained in building an issue that is not only attractive but filled with inspirational material that should be of great value.

The manufacturers are to be complimented on the ingenuity displayed in the presentation of their message, and I believe this issue could well be filed as a catalog of the products used in the industry.

Letters from many other executives contain similar comments regarding both the articles and advertising in this issue. Excerpts from some of these are printed below:

Walter H. Burke, manager Northern Texas Traction Company:

I want to congratulate you and the members of your staff on the 1926 Convention Issue of the JOURNAL. In my opinion it is the best of the many good issues you have published.

There no longer is much doubt in the minds of transportation men that "modernizing, popularizing and merchandising" offer the way out of the troubles the business has been through in the past ten years. This issue of the JOURNAL, along with the very successful convention at Cleveland, will surely go a long way to give added impetus to this idea.

S. B. Irelan, vice-president and general manager St. Joseph Railway, Light, Heat & Power Company:

Your Annual Convention Number this year of the ELECTRIC RAILWAY JOURNAL is, in our opinion, one of the best issues you have ever put out.

The featuring of the single subject "Making Transportation Pay" and making that the keynote for all of the comments and discussions of the various leaders of the industry in all parts of the country gives recognition to its importance and is impressive.

Today the transportation problem is perhaps in a little more critical state for all medium-sized cities than it is in the larger cities. It is our hope that you will continue to treat of the particular phases of the transportation problem in these cities as well as the larger systems.

R. R. Smith, vice-president and general manager Chicago, South Bend & Northern Indiana Railway:

Each year I look forward with anticipation to the receipt of the Annual Convention Number of the JOURNAL. I have never been disappointed in it.

This year the convention issue is exceptionally interesting and the outstanding problem of the day, "Making Transportation Pay," is presented in a very striking manner. The whole industry is indebted to you for this issue.

H. A. Nicholl, general manager Union Traction Company of Indiana:

This year's issue is a masterpiece and you have certainly handled the subject of "Making Transportation Pay" in an able manner. The men who wrote the various articles for you are all high-class operators and know what they are talking about, and if those executives who are in a position to follow the examples set for them do not take advantage of the situation they are not doing all they should for their properties.

The advertising matter in this issue alone contains a liberal education on electric railway and bus operation.

J. J. Coleman, operating vice-president and general manager Scranton Railway:

You have put out a splendid issue, and I think any railroad man will find his time profitably spent in going over it carefully.

A. C. Spurr, general manager Wheeling Traction Company:

You are certainly to be complimented on the Convention Issue of the ELECTRIC RAILWAY JOURNAL. It is indeed a handbook on making transportation pay and a ray of hope to many of the operators struggling with a collection of antique facilities.

My sincere hope is that you have a large circulation among those financially interested and responsible for street railway transportation.

I have no suggestions to offer on the make-up of the JOURNAL, as I believe you are doing an outstanding work in revivifying an industry that for a time lost its confidence. You are indeed builders of morale.

V. R. Powell, general manager the Peoples Railway:

You are indeed to be complimented on the thorough manner in which the industry is exploited in this Convention Number.

We think so much of the ELECTRIC RAILWAY JOURNAL that we have recently interested our company in buying three additional subscriptions in order that each head of a department may be favored with a free subscription. We find that this is money well spent. With these three additional subscriptions we now have six subscriptions, each department head receiving a separate copy. We find that these are passed out to pivot men and foremen and that they are pretty well worn by the time they are returned for filing, which would indicate that those receiving them were very much interested and took advantage of the opportunity to acquaint themselves with the different angles of the industry in which they are employed.

John F. Collins, vice-president and general manager Michigan Electric Railway:

I think the issue is A-1 in every respect and I greatly enjoyed reading it. I have no suggestions to make regarding improvements.

W. H. Evans, manager of railways East Penn Electric Company:

Your Annual Convention Issue of the ELECTRIC RAILWAY JOURNAL is the best ever. While I have not had time to look at it from cover to cover, I assure you that it has been a great pleasure for me to read several of the articles which appeared in this issue.

It has also been an extreme pleasure to note how well the advertising pages have been prepared, and I wish to congratulate every member of the ELECTRIC RAILWAY JOURNAL staff, as it surely does show that some wonderful work has been done with untiring efforts.

G. W. Comfort, general manager Poughkeepsie & Wappingers Falls Railway:

While I have not as yet had an opportunity of reading this issue over thoroughly, I have glanced through same and herewith wish to compliment you on its compilation. It certainly is an issue which is a real inspiration and deserves commendation.

W. W. Foster, general manager Rochester, Lockport & Buffalo Railroad:

I have received a copy of your Annual Convention Issue and consider it a work of art, and as an ordinary layman can find no fault with it and cannot see where it could be improved, and I wish to congratulate you.

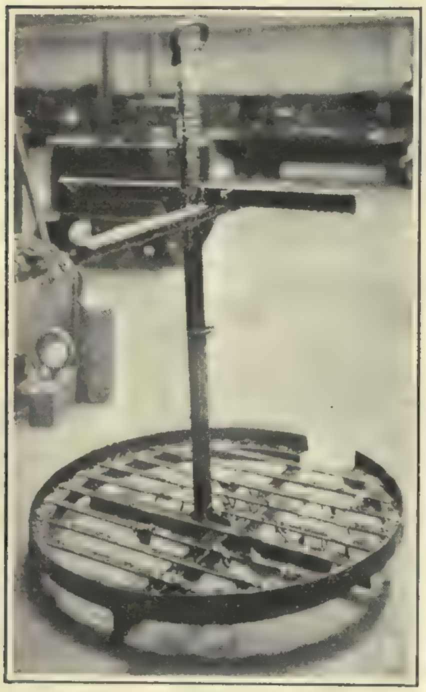
ELECTRIC RAILWAY JOURNAL takes this means of publicly thanking those railway executives who made this issue so successful by contributing of their time to tell the industry the results of their own experiences in "Making Transportation Pay." At the same time the JOURNAL wishes to acknowledge these many letters of friendly comment and to thank its readers for this evidence of interest and co-operation.

Charles Gordon
Editor

Maintenance Notes

Handy Tree for Dipping Small Coils

VARIOUS devices have been used to facilitate the dipping of a large number of small coils at one time. A device which has been found to work out very successfully in the department of electrical repairs of the Brooklyn-Manhattan Transit Corporation is shown in the accompanying illustration. This consists of a circular base with straps across to support small pieces of equipment and a vertical post with two cross-arms arranged so that coils can be hung on these. The circular bridge is constructed with two 1½-in. x 1½-in. angles as the outside supporting ring. Cross-straps 1 in. wide x ½ in. thick are riveted to the circular rim. As a further support two 1½-in. x 1½-in. angles are placed underneath and the upright, which is a 2-in. x 2-in. angle, is riveted to this. The cross-arms at the center part of the upright are 1½-in. x 1½-in. angles and are 3 ft. long. The opening in the outside rim of the base, as seen in the illustration, is so that this will fit over a pipe connection inside the tank as the various equipment is being dipped. In ordinary operation coils are hung on the cross-arms and other coils are placed on the bottom circular support. A ring at the top provides for convenient handling with overhead hoist or crane.



Field and Other Small Coils Are Dipped Conveniently by Using a Device as Shown

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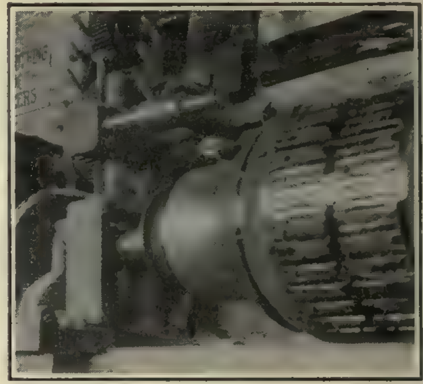
The rattle of the armature windings, like the rattle of a snake, should be a warning. "Operators, why not 'dip and bake'?"

Old Lathe Bed Serves as Base for Commutator Slotter

SLOTTING commutators with a home-made apparatus has proved very satisfactory in the shop of the Berkshire Street Railway, Pittsfield, Mass. Possessing an old lathe bed and a small motor of fractional horse-power it was decided to rig up a slotting mechanism which could be adapted to commutators on any of the armature sizes in use by the railway. The motor is accordingly mounted on the wall directly in the rear of the slotter and connected thereto by a flexible shaft which transmits the torque from the motor to the shaft on which the slotter is mounted.

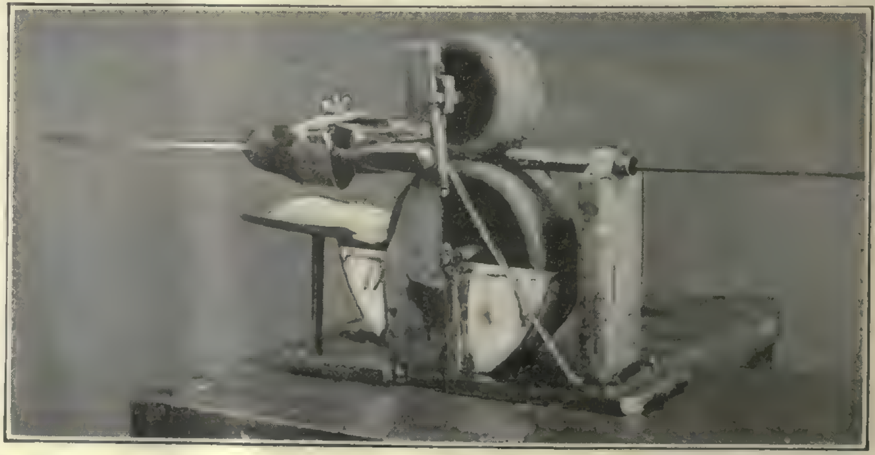
As indicated in the accompanying illustration, both horizontal and vertical adjustment in the slotter may be accomplished, the first by moving the collars on the rods shown above the slotter blade back and forth in a direction parallel to the armature shaft, while the latter is effected by simply raising or lowering the slotter mechanism on the vertical shafts shown directly above the end of the armature shaft. Movement of the slotter is easily controlled and it is possible to slot an entire commutator in a very few moments.



Slotter Is Here Shown Suspended Directly Above a Commutator Which Is Ready for Slotting

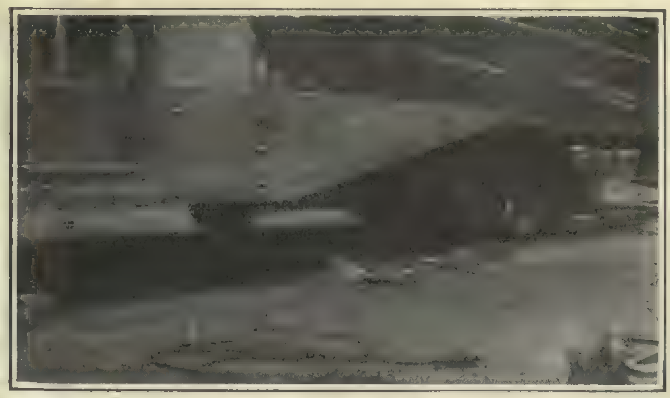
Window Stripping Quickly Varnished in Cleveland

SMALL wood strips used for molding or for holding the glass in place in car windows are quickly stained or varnished by the machine illustrated, which was recently constructed in the Harvard shops of the



Window Strip Quickly Painted by Machine in Cleveland Railway Shop. Felt-Covered Wheels Cover the Strip with Stain or Varnish as the Material Is Pushed Through

This Car Side Has Been Entirely Rusted Through by the Water Encountered in Operation



The Unsightliness of the Rusted Side Is Obviated Through the Use of Steel Plates Similar to the One Pictured Here

Cleveland Railway. The strip to be painted enters through the core of the machine from the right-hand side and passes through two felt-covered wheels, one of which dips in a tank of stain or varnish at the bottom. When the strip emerges from these rolls the paint material is thoroughly rubbed in by the brushes supported on the left in the view. This also removes the surplus material, which drops into the trough below and then runs back into the supply tank.

While the brushes used are of the ordinary commercial type, it is planned to have one specially constructed to do this work.

Repairing Car Sides Which Have Become Badly Rusted

CONSIDERABLE difficulty has been experienced by the Portland Railroad, Portland, Me., with rusting out of steel car sides. Unusually severe water conditions are encountered in Portland and it is also necessary to use a large amount of salt in keeping the switches clear. Thus a continual spray of semi-frozen brine is thrown upon the car sides, particularly between the sills and the car floors. This results in a severe rusting of the steel sheathing from the inside.

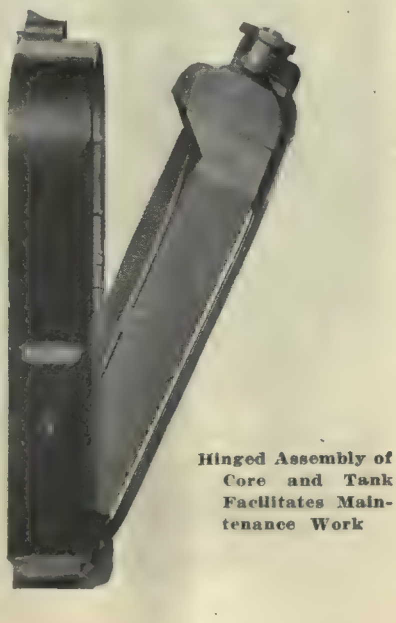
To meet this condition the railway uses four steel plates, similar to the one shown in the right hand illustration, to cover the rusted portions of the car sides. The most serious rusting always occurs near the middle of the car and it is seldom necessary to do more than to add the triangular plates at each side of the center doors. If it is necessary to attach a single plate the three other sides are similarly equipped regardless of the degree of rust at those points. This is done to preserve the general well-balanced appearance of the car. Steel plates of ½ in. to ⅝ in. thickness are used for this purpose.

New Equipment Available

Radiator Core Easily Removable

EXHIBITED on the chassis of the Liberty Motor Vehicle Company at the Cleveland convention was a specially designed Perfex radiator, built by the Racine Radiator Company, Racine, Wis. Several newly developed features were incorporated in the design of this radiator.

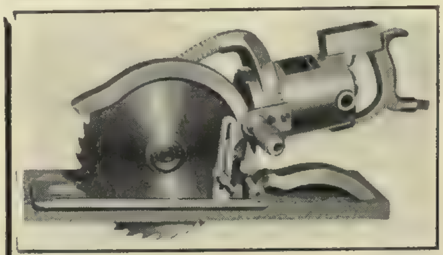
The shell is permanently bolted directly to the dash and fits snugly up against the hood. The core and tank assembly is hinged at the bottom, so that the core may be quickly and easily removed by taking off two nuts at the top and two at the bottom. It is not necessary to disturb the shell at all. Both top and bottom tanks are cast material, built to withstand every vibration and road shock to which a bus might be subjected. The core is a standard bronze unit design used by Perfex. The shell is cast duralumin, polished and enameled to withstand corrosion and wear.



Hinged Assembly of Core and Tank Facilitates Maintenance Work

Convenient Electric Hand Saw

PORTABILITY is the feature of an electric hand saw weighing about 24 lb. that has been brought out by the Wodack Electric Tool Corporation, Chicago, Ill. The motor with which this tool is equipped is sufficiently large to drive an 11-in. circular saw and yet may be operated from the ordinary electric light socket supplying 110 volts. The saw is capable of cutting a 4-in. x 4-in. timber in less than two seconds and is of particular value in doing rough carpentry work where speed is the primary requisite.



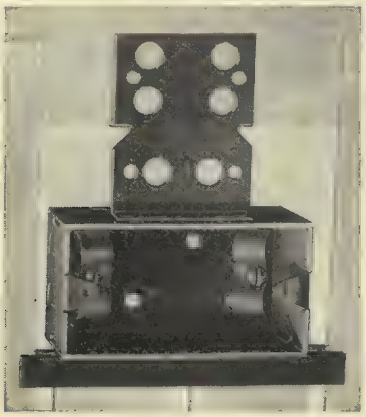
This General Utility Power Saw Saves Much Time. It Is Readily Adjustable

The saw is fitted with a depth gage, so that it is necessary only to cut through a timber to the depth required. In addition to regular carpentry work the saw is well adapted, due to the depth gage feature, for use in opening shipping boxes and crates, it being possible to saw the exact depth of the board or box cover, thereby preventing any injury to the contents of the box.

Switch and Receptacle Boxes

FOUR-INCH switch and receptacle boxes, suitable for wall bracket outlets due to their larger size, have been developed by the Chicago Fuse Manufacturing Company, Chicago, Ill. These boxes are obtainable in both the "Gem Locktite" and "Gem Bracket" types.

The Gem 4-in. Locktite box has the same steel supporting bars as the standard boxes of this type developed heretofore. This makes it well adapted for quick, secure mounting. It may be installed in either the perpendicular or horizontal position and is provided with knockouts for loom, sheathed cable, flexible and rigid conduit. It has a provision for a fixture stud in the bottom of the box.



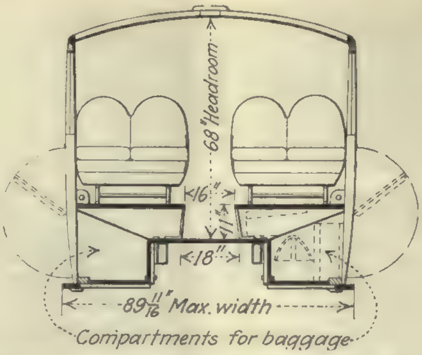
Four-Inch Locktite Box

The 4-in. bracket boxes are similar in design. The bracket attachment makes installation easy and quick, no mounting bars being required. The ears in both these boxes are turned in so that the center distance between the drilled and tapped holes is the same as for standard boxes, and all switch and receptacle plates may be used.

Bus Body with Baggage Compartments Under Seats

CONVENIENCE of entrance, ease of walking down aisle and provision for storage of baggage below the center of gravity of the chassis feature a new intercity bus body the Lang Body Company, Cleveland, Ohio, has just brought out. This provides space so that some 40 pieces of baggage can be carried in receptacles under the seats which are in locked, water-proof and dirt-proof compartments controlled by the operator and easily accessible at all times. The over-all height of this bus is less than that of similar bodies with baggage racks, and this construction insures a comfortable seat in all positions of the bus with a clear and pleasing road vision.

The body has been built for and is mounted on a new Mack AL six-cylinder chassis.



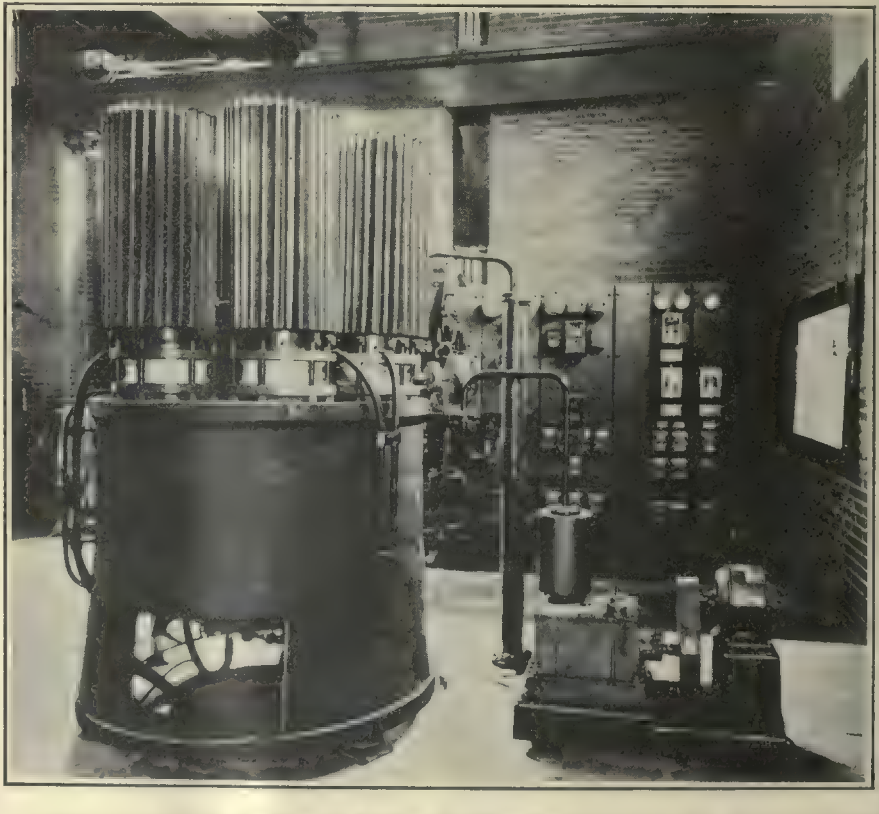
Cross-Section Showing Compartments for Baggage and Seating Arrangement

Another Type of Mercury-Arc Rectifier

THE appearance of a new design of mercury-arc rectifier in the booth of the Westinghouse Electric & Manufacturing Company at the Cleveland convention marks the first time that this company has put forward this equipment to the industry. The design of the Westinghouse company in outward appearance resembles those of other manufacturers of arc rectifiers. It operates on the same principle as the glass mercury-arc rectifiers which have been used for battery charging and similar applications for a number of years. The inner steel tank is vacuum tight and capable of retaining a degree of vacuum of 1/1,000,000 atmosphere. Vacuum pumps and gages form a part of the equipment.

The unit shown in the Cleveland exhibit was an exact duplicate of the unit which has been placed in service in substation No. 16 of the Cleveland Railway, as shown in the accompanying illustration. Rectifiers of this design are commercially practicable for power conversion for voltages of 500 d.c. and over and for currents of 500 amp. or greater. They are thus particularly practicable for railway service. The same unit can also be applied for a wide range of voltage applications when used with the proper ratios of transformers. The current capacity decreases slightly with higher voltages, but the efficiency raises as the voltage increases.

The rectifier holds some advantages over the synchronous converter, such as improved full load efficiency, correspondingly higher efficiencies at low loads and the absence of moving parts except in the motor-driven pump, which is operated intermittently. The lighter weight of the rectifier generally will permit economies in substation construction.



Mercury-Arc Power Rectifier in Service in Substation No. 16 of the Cleveland Railway

Association News and Discussions

Utility Commissioners Meet Nov. 9-12

WILLIAM A. PRENDERGAST, chairman New York Public Service Commission, will deliver one of the principal addresses at the 38th annual convention of the National Association of Railroad and Utilities Commissioners, to be held at Asheville, N. C. Mr. Prendergast is chairman of the association's public utility rates committee, and in addition to delivering an address to the convention will submit the report of his committee. Regulation of interstate motor vehicle carriers will be one of the chief topics of discussion at the convention this year. Water power and its regulation, which, when the association was formed, was considered far beyond its jurisdiction, also will be a leading topic for the consideration of the convention.

The convention will last from Tuesday, Nov. 9, until Friday, Nov. 12. There will be special addresses by Commissioner John J. Esch of the Interstate Commerce Commission, M. H. Aylesworth, former chairman of the Public Utilities Commission of Colorado; John A. Small, president of the National Rivers and Harbors Congress; Alexander Forward, formerly a member of the Virginia Corporation Commission; C. C. McChord, former chairman of the Interstate Commerce Commission, who will speak on the subject of "Regulation of Interstate Motor Vehicle Carriers"; Edward W. Bemis, public utility expert of Chicago, and H. A. McKeown, K. C., chief commissioner of the Board of Railway Commissioners for Canada, who will speak on the subject of "Regulation in Canada."

The convention sessions will be held at the Battery Park Hotel, which is also to be the headquarters of the association.

S.A.E. to Discuss Bus and Truck at Meeting Nov. 16-18

TRANSPORTATION — the latest methods of passenger and freight carriage by motor—will be delineated in the national meeting of the Society of Automotive Engineers to be held on Nov. 16-18 in Boston, Mass., at the Copley Plaza Hotel.

The meeting will be divided into five technical sessions, at which some of the most interesting subjects to railway men will be the presentation of the following: "Economics of Co-ordination of the Railroads and Highways" by W. J. Cunningham, professor of transportation of the Graduate School of Business Administration of Harvard University; "Motor Coach and Railroad Operation, Co-ordinated" by A. P. Russell, president of the New England Transportation Company of Boston; and "Economics of Motor Vehicle Transportation Correlated with Steam and Electric Railroads" by G. L. Wilson of the Wharton School of Finance and Commerce of the University of Pennsylvania.

Another session will be devoted to freight handling. F. I. Hardy, assistant to the chairman of the executive committee Boston & Maine Railroad, will discuss "Co-ordination of Railroad and Trucking Operations." W. P. Kellett, consulting engineer of Brantford, Ontario, will talk on the "Co-ordination of the Container with Rail and Road Transportation Facilities." At the motor coach and truck operation session, G. T. Seely, vice-president of the Chicago Motor Coach Company, will talk on "Modern Motor Coach Operation."

American Association News

Committee on Education Urges Co-operation

EDUCATIONAL directors of electric railway properties are urged to co-operate with the committee on education of the American Electric Railway Association by sending in their names to Edward Dana, the newly-appointed chairman of this committee, who is compiling a directory of such data. In order that every railway company may be represented in this new compilation, this information is requested promptly.

Replies should be directed to Edward Dana, general manager Boston Elevated Railway, Boston, Mass. Information is desired in the following form: name of director, name of company, address, title of director.

Public Service Section Opens Season

WITH more than 400 railway men of New Jersey attending, the Public Service company section of the American Electric Railway Association held its first fall meeting Oct. 21 in the auditorium of the Montgomery Street carhouse in Jersey City. The A.E.R.A. members were the guests of the Boosters Club, a get-together organization of railway men in the Hudson Division of Public Service. Robert Hoos, president of the Jersey City Chamber of Commerce; Joseph F. Autenreith, president of the State Board of Public Utility Commissioners, and Edmund W. Wakelee, vice-president in charge of law, Public Service Corporation, were the speakers.

David Alberts, president of the Boosters Club, opened the meeting and then turned it over to A. T. Warner, president of the company section, who presided and introduced the speakers.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Nov. 5—**American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p. m.**

Nov. 9-12—**National Association of Railroad and Utilities Commissioners, annual convention, Battery Park Hotel, Asheville, N. C.**

Nov. 16-18—**Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.**

Nov. 17-18—**Iowa Electric Railway Association, operating and maintenance section, annual convention, Fontanelle Hotel, Omaha, Neb.**

Nov. 17-18—**Central Electric Traffic Association, regular meeting, Fort Wayne, Ind., Keenan Hotel, 9 a. m.**

Dec. 6-9—**American Society of Mechanical Engineers, annual meeting, New York City, Engineering Societies Building.**

Metropolitan Section to Continue Activities

RELATIONSHIP between transportation and community development will be the subject of discussion at the second meeting of the season of the Metropolitan Section, A.E.R.A., to be held Friday, Nov. 5, at the Engineering Societies Building at 8 p.m. A Dutch treat dinner will be held at 6 o'clock at Friedlander's restaurant, on 39th Street opposite the meeting place.

The program for the evening includes addresses by L. S. Miller, president New York, Westchester & Boston Railroad, on "Team Work Between Transportation Companies and the Communities They Serve," and C. S. Ching, supervisor of industrial relations United States Rubber Company, on "The Transportation Man in Civic Affairs." High spots of the Cleveland convention will be the subject of remarks by Guy C. Hecker. Officers for the ensuing year will be elected at this meeting. The usual entertainment features will be part of the evening program.

Helpful Hints on Electric Railway Advertising

ELECTRIC railway men interested in advertising may get helpful suggestions from the 2,000 ideas presented in a looseleaf folder prepared by Labert St. Clair, director of advertising of the American Electric Railway Association. Complimentary copies of this booklet are available to each member company upon request. Non-member companies may receive them upon payment of a small fee. Mr. St. Clair points out that there are enough definite advertising suggestions in this compilation to last the average company at least five years.

The News of the Industry

Franchise Discussion Renewed in Kansas City

About 50 petitions for a referendum on the extension of the present railway franchise were placed in circulation in Kansas City, Mo., on Oct. 22.

This action was started to nullify the approval by the City Council of an ordinance extending the present franchise for a period of twelve years in favor of the Kansas City Public Service Company, the successor under foreclosure to the Kansas City Railways.

The petitions, to become effective, must bear something over 12,000 signatures of voters.

In the meantime, a committee of the Council appointed to consider plans for an entirely new franchise is meeting at intervals with William G. Woolfolk, president of the new company, or with his representatives, in an effort to complete the tentative draft of the new franchise document within the next 30 days, if possible.

Chicago Traction Ordinance May Be Made Political Issue

The first real indication that a political issue will probably be made of the pending traction ordinance in Chicago came to light at a conference on Oct. 20 between the City Council and Chicago Surface Lines officials. Patrick J. Lucey, attorney for the Chicago Rapid Transit Company, insisted that the home rule provision in the proposed franchise be dropped.

"The traction referendum is coming very near a mayoralty election, and if we drop the home rule feature it will be the issue of every candidate for Mayor and the Council," Alderman Jacob Arvey explained to the elevated lines' representative.

Asked by other Aldermen if he thought any ordinance would be passed if it left control of the transportation companies with the Illinois Commerce Commission, Mr. Lucey replied that, in his opinion, local regulation was passing and the public did not care so much about who runs the street cars as it did about good service.

D. S. McKinlay, chairman of the traction sub-committee of the City Council, declared that the city was approaching a settlement by agreeing to a terminable permit. He believed, however, that the provision for home rule by a city commission must be adopted in the ordinance in spite of the risk that the Legislature may fail to pass enabling legislation and so nullify it.

At another meeting, on Oct. 22, Leonard A. Busby, president of the Chicago City Railway, submitted figures showing that the companies have spent $1,700,000 in the twelve years ended Jan. 31, 1926, for track changes due to street widenings and regradings. He held this to be an unjust burden on the car rider.

Corporation Counsel Francis X. Busch held, on the contrary, that it should be retained in the ordinance. If the division of costs is left to the courts, he said, the resultant legal red tape would jeopardize all future street improvements.

In the new ordinance, a draft of which is now being prepared by Mr. Busch, two controversial points are to be left open, namely, the evaluation of the systems and the amount to be allotted for maximum capital expenditures.

Eight-Cent Cash Fare in Duluth

Litigation between the Duluth Street Railway, Duluth, Minn., and the city of Duluth took on a new turn recently when the Minnesota Railroad and Warehouse Commission issued an order increasing fares in Duluth from 6 cents straight to a cash fare of 8 cents with the option of purchasing tokens good for one ride at the rate of five for 35 cents.

The fight for an increased fare on the part of the company began in 1921 when it sought to boost a 5-cent fare to 6 cents. The Railroad and Warehouse Commission granted the 6-cent fare, but provided that if tickets were purchased the rate should be five rides for 25 cents. The company obtained an injunction from the federal court against the enforcement of that portion of the order which called for a 5-cent rate for five rides. The appeal of the city and the state from the decision of the federal court is now pending in the United States Supreme Court.

Cleveland Welcomes Its New Traction Chief

The directors of the Cleveland Railway chose the logical man to succeed the late John J. Stanley as president—logical not so much because Joseph H. Alexander was next in line for the office as because the new chief by character, training and hard experience had specifically fitted himself for it. Both in private practice of his engineering skill and in war service Alexander has shown his ability to handle the kind of problems that the directorate now give him to solve.

With Stanley passed the old régime in local transportation. The new comes in with Alexander. The late president, climbing by the ladder of hard knocks, made himself a figure in the community. His successor, with more training on the technical side, has an even better opportunity. Cleveland welcomes the new traction chief.—*Cleveland Plain Dealer.*

Five-Cent Fare Referendum Barred in New York

The proposed referendum on a 5-cent fare cannot go on the ballot in the coming New York City election on Nov. 2. The Court of Appeals so decided in an opinion handed down on Oct. 22. This decision reversed the opinion of the lower courts.

The 5-cent fare referendum was adopted as a local law by the Municipal Assembly under the city home rule law and signed by Mayor Hylan on Sept. 17, 1925. The local law made it illegal for the Board of Estimate to authorize or effect any change in rapid transit contracts for the purpose of increasing the fare above 5 cents, or to grant any bonus or subsidy, or to consider such a proposal until after it had been submitted to the voters upon a referendum and had been approved by a majority.

The law also provided that such a referendum could not be submitted to the voters unless a petition had been filed signed by 15 per cent of the voters at the last previous state election.

It had been hoped to place such a referendum before the voters at the 1925 elections, but Frank J. McCabe, a taxpayer, the relator in the suit just decided, brought a similar action in 1925 for the same purpose and the court decided there were not the required 90 days between the date of the passage of the referendum resolution by the Municipal Assembly on Sept. 17, 1925, and election.

The latest action was an application for an injunction restraining the Board of Elections from submitting the proposed referendum to the voters at the coming election.

Birmingham Goes After Coffin Award

Officers of the Birmingham Electric Company, Birmingham, Ala., through the *Buzzer* announce the impression made upon them by the exhibits at the recent convention of the American Electric Railway Association of the railway companies which competed for the Charles A. Coffin award, won by the Pennsylvania-Ohio Electric Company. H. E. Cox, assistant general manager at Birmingham, states that the existence of cordial relations with employees, public and management went far in aiding the company to win the honor of being the most distinguished contributor to the industry in 1925-26.

Mr. Cox recommends a union of efforts in Birmingham in co-ordinated teamwork so that next year the record of the Birmingham Electric Company will be foremost among the competing companies. He urges all alike to make a good job of it and thereby help to win the Coffin award.

Mass Carriers Found Supreme in Chicago "Loop" Traffic Check

In a report following a ten months study of street traffic conditions recently completed by Miller McCormick, director of the Albert Russel Erskine Bureau for Traffic Research, and submitted on Sept. 24 to the Chicago Association of Commerce it established that the downtown streets of Chicago carry 846,753 persons and 314,610 vehicles on an average week day, a greater traffic density than in any other city in the United States.

This congestion is made worse, Mr. McCormick points out, by horse and buggy parking practices, a lack of wide streets and high speed arteries, too much jaywalking, and archaic traffic laws.

In co-operation with the department stores, banks, restaurants, and other business institutions, a cordon count of the "loop" district was made last June. More than 96,000 shoppers were interviewed on a typical week day to secure information on the transportation which these store visitors utilized in coming to the "loop." The check-up showed that only 8 per cent drove their cars into the central business district and a bare 1.57 per cent left their cars at the curb to add to the disastrous street conditions which now prevail in the "loop." In other words, the practice of parking accommodates only 15 out of every 1,000 shoppers, while the overwhelming majority of 985 are, as a result, jammed at street intersections, delayed on street cars and buses and otherwise so discommoded as to drive them to the neighborhood stores.

In no loop business house did the percentage of car-parking patrons exceed 3.2 per cent, said Mr. McCormick, in commenting on the talley. He said:

> From this study the conclusion is warranted that curb parking is not supplying a considerable part of the patronage of business houses in downtown Chicago. As a matter of fact, interviews with 96,082 patrons show that more than 19 per cent came to the "loop" on suburban trains, 33.8 per cent on elevated trains, 26.2 per cent on street cars, 11.4 per cent on buses, and slightly more than 1 per cent arrived in taxicabs. From these figures it will be seen that the largest feeders of loop patronage are the mass carriers and not private automobiles.

Among the recommendations for relief which the Association of Commerce contemplates making to the City Council as a result of this $50,000 traffic survey are drastic curtailments in, if not entire elimination of, parking, new arteries, more light controls and other traffic regulations.

Seattle Recommendations to Become Effective

Mayor Bertha K. Landes of Seattle, Wash., has instructed David W. Henderson, superintendent of the Seattle Municipal Street Railway, to put into effect, as soon as practicable, recommendations in the Jackson street railway report which it has been estimated will result in reducing expenses approximately $100,000 a year. The report was prepared by Clark R. Jackson, superintendent of utilities, and deals mainly with elimination or curtailment of shuttle car service. No conclusion has been reached, the Mayor said, regarding the proposal to establish a loop system, the chief recommendation in the report, which it is estimated would save $500,000 a year. The Mayor states that more time will be devoted to a study of the loop plan, and that while it might not be possible to adopt the proposed program in its entirety, it may be used as a working basis in making changes that would materially reduce operating costs.

Kansas City Valuation Discussed

Approximately a $25,000,000 Price Put on Properties by Dean Riggs—Service-at-Cost Plan Recommended

Dean H. E. Riggs of the University of Michigan, appearing on Oct. 22 before the special Council committee at Kansas City, Mo., placed the value of the properties of the Kansas City Public Service Company at approximately $25,000,000. He said that if Kansas property of the local company were to be included the valuation should be set at $28,000,000.

Having valued the railways property for the federal court in 1925, Dean Riggs was invited to appear at the committee meeting. He said that he had not been in touch with the property for several months and that he had been admonished by the federal court not to state his personal opinion of the valuation of the property, but to consider the situation from all angles, submitting reports of valuations based on the various theories used by engineers in making previous valuations.

Mr. Riggs pointed out that while his report had been submitted to the court in August, 1925, it was based on the value of the property as of Dec. 31, 1924, and that he was not in a position to discuss the matter of property additions since Jan. 1, 1925.

The valuation at that time, made on bases of historic cost at the time of initial investment, cost of reproduction at the latter date and on various intermediate bases, ranged from $24,216,884 to $48,985,402 for property in Missouri only.

In replying to a question as to what valuation he would suggest be written into the new franchise at this time, Mr. Riggs said:

> For these negotiations the figure would lie between $20,500,000 and $34,500,000, or about $25,000,000 to $26,000,000 for ratemaking purposes. This includes only the property in Missouri, but as this will have to carry the burden of the property in Kansas, that also should be taken into consideration. In that event, I would place the value at somewhere in the vicinity of $28,000,000.
>
> If the property in Missouri is put into good shape it should be able to carry a valuation figure of about $25,000,000.

Professor Riggs recommended the service-at-cost plan as beneficial in arranging a new franchise grant. He expressed himself averse to the indirect taxation features of the present Kansas City franchise, providing for the paving between car tracks and the payment for use of viaducts and for street cleaning by the operating company. He intimated the exclusion of such demands in the new franchise might tend to reduce fares under a service-at-cost plan.

An ordinance which excluded these provisions from the franchise was killed by the local Council previous to the passage of the twelve-year extension of the present franchise. At the time the view was expressed that the operating company should continue to pay such assessments or charges.

Dean Riggs warned that to fix the valuation of the property at a figure too high would, in his opinion, merely cause the company to revert to receivership at some later date. He thought a minimum return of 8 per cent fair.

William G. Woolfolk, president of the Kansas City Public Service Company, and Timothy F. Mullins of Chicago represented the new company at the hearing. Mr. Mullins was appearing in the absence of Bennet C. Clark, who was ill in St. Louis at the time.

The committee meeting was adjourned until Oct. 28.

More Antiquated Cars Burned

Ten obsolete cars of the Key System Transit Company, Oakland, Cal., have been burned on the Key Mole and 31 more are to follow. These cars have been replaced by an equal number of modern type on the lines of the system. They were removed from active service some time ago.

The metal parts, motors, headlights and other useful portions were removed before the cars were towed to the Keel station on the mole, where the torch was applied. Thousands of people watched the unusual sight of the burning vehicles. As the cars were towed to their final destination on their own wheels wreckers tipped them off into the marsh where they were burned one after another.

No ceremony attached to the cremation, but one enterprising East Bay newspaper took movies that were later shown at an Oakland theater.

Increase in Fare Asked in St. Louis

Early action is expected by the Missouri Public Service Commission on the application of Receiver Rolla Wells of the United Railways, St. Louis, for permission to raise fares from 7 cents pending an audit of the company's books. This latest application for higher fares does not stipulate the rate desired, but suggests a rate that will enable the company to meet operating expenses and pay a fair return on at least the 1919 valuation.

Receiver Wells filed his application on Oct. 23. He asserted that since June, when the company filed a prior application for an increase in fares to 8 cents, or two tokens for 15 cents, the company has lost $506,000 and that revenue will fall about $116,000 short of expenses of operations each month the present fare of 7 cents is continued.

The new petition further sets forth that in 1925 the company earned less than 5.2 per cent on the valuation of $51,781,348 as of Jan. 1, 1919, fixed by the commission, and that since that time $4,948,787 had been spent for additions and betterments. For the year ended on Aug. 31, 1926, the railway system earned less than 5.4 per cent on the 1919 valuation.

Mayor Victor J. Miller and other city

officials are expected to oppose any immediate increase in fare. When the application was filed last June the city insisted that the commission defer hearings on the petition until an audit had been made of the company's books. The request was also made that the accounts of the city and county lines be separated.

Recently Mayor Miller is said to have informed company officials that he would not consent to an immediate increase in fares even of a temporary nature, but would insist on delay until the audit had been completed. Auditors of the state commission are now at work on the company's books.

It has been the policy of the commission to grant temporary relief where losses are apparent.

St. Petersburg Road Up to Date

Small Municipal Line a Model, but Is Run at Loss—Large Sums Spent on Improvements—Bus Lines Supplementing Railway Service

ST. PETERSBURG'S railway system has entered the eighth year of public ownership under supervision of Director R. E. Ludwig, head of the public utilities department. Additional improvements in the plant, rolling stock, rail extensions and general equipment, authorized in the sum of $400,000 by the bond issue voted last fall, are now under contract and construction.

During the seven years that the railway has been under municipal operation the receipts have amounted to $1,410,236. The record of receipts follows:

1919-20	$89,302
1920-21	127,628
1921-22	151,582
1922-23	179,114
1923-24	218,570
1924-25	270,819
1925-26	373,218

During the last fiscal year, ended June 30, 1926, the railway showed operating profits of $54,397, an income of $373,218 and assets of $855,477, but an actual net loss of $19,405 was caused as the result of costs of extensions and improvements and deductions for interest on bonds which amounted to $73,803.

DETAILS OF NEW BOND ISSUES

At the original sale of the old lines, the St. Petersburg & Gulf Railway was taken over for $165,000 by a group of Northern capitalists who held mortgages on the property amounting to $250,000. Under an agreement with an option to purchase, the city of St. Petersburg began operation of the lines July 1, 1919. By a vote of 350 to 103 on a referendum election, citizens authorized a bond issue of $250,000 for the purchase of the railways Aug. 30 of that year. They bought eight street cars, four of which are still in use as work and repair cars, and lines to Gulfport, the Jungle, Big Bayou and the North Shore, with cars operating on a two-hour schedule, compared with the ten and twenty minute schedules now adopted. Of the original bond issue voted for the purchase and reconstruction, $22,000 was devoted to equipment, $28,500 for repairs to roadbed and tracks and $175,000 for the right and title to the old railway.

During the first five months of operation by the city, other bond issues totaling $480,000 were voted for the purchase of rolling stock, construction of extensions, double tracking and general improvements. Since that time many other improvements and extensions have been made.

All general improvements and operation of the railways have been handled as direct charges against revenue funds without taxes and with no increase in the fare of 5 cents. In addition the municipal railways division of the public utilities has provided for a sinking fund, depreciation charges and interest on bonds.

Provision for further improvements in the local municipal railways system were made in a bond issue voted last November which authorized an expenditure of approximately $400,000. Much of the work has already been completed, while the balance is either in the course of construction at this time, as at the new carhouse adjacent to Ninth Avenue north, or in preparation under specifications now being drawn up.

The new improvements include:

The purchase of eight double-truck cars, $100,000.

Reconstruction and extension of tracks, including special work and passing tracks for necessary improvement of schedules, replacement of light rails by heavier, $19,650.

Extension on Ninth Avenue north, $59,230.

Erection of carhouse, including paint shop and offices, together with repair pits and equipment, $105,284.

Construction of track from Ninth Street north to shops, $55,739.

Tracks in yard at carhouse for material storage and track usage, $31,977.

Extension of tracks to create a loop up First Avenue north to Ninth Street, $15,000.

In addition to the amounts voted for actual railway improvements $235,000 was allowed for the purchase and installation of two new units at the municipal power plant.

During the last three months the transportation system has been supplemented with two lines of buses operating eight 21-passenger coaches north and south through the main traffic lanes of the city not reached by the electric cars.

The railway as now run comprises 27 miles of line.

Railway Seeks to Justify Refunds

A special hearing was held at Kansas City, Mo., on Oct. 16 before three federal judges on the application recently filed by the receivers of the Southwest Missouri Railway, Joplin, Mo., for a restraining order to prevent the Interstate Commerce Commission from enforcing its order issued against the company last August.

The commission's order forbade the receivers of the railway paying fees to truckers hauling ore from mines to the cars of the company. The commission in issuing the discontinuance order contended that the payment of such fees amounted to a rebate to the mines of a portion of the freight charges, a practice forbidden by the commission.

The receivers of the railway contend that payment of the fees in question is necessary to the prosperity of the road, much of the revenue of which comes from ore shipped from lead and zinc mines in Missouri, Oklahoma and Kansas.

"Two-Bit" Football Tickets for Pittsburgh's Sixteens

What does it matter that the day of the 5-cent shave has gone forever, when a new era has dawned in 25-cent football games. In Pittsburgh, boys and girls who are sweet sixteen and proud possessors of quarters are sitting on top of the world, namely, Forbes Field, yelling

PI-TT-PITT
PI-Double T
PITT

While Baltimore debates over the propriety of donning spats to welcome a queen, New York shakes the greasy hand of its latest aquatic marvel and Philadelphia cogitates the practicability of a 1927 Sesqui, Pittsburgh has suffered the little children to come unto it and they have found the Kingdom of Heaven. Their good fortune came about through a plan developed by the Pittsburgh Railways, the Pittsburgh *Post*, the University of Pittsburgh and the Carnegie Institute of Technology to make the school-less Saturday a real holiday. The idea embraced transportation to the football games and back home, as well as admission into the huge athletic bowl reserved for their exclusive use, and all this for 25 cents.

The special football-street car pass is good on all lines of the Pittsburgh Railways except the interurban lines (Washington and Charleroi) between the hours of 1 p.m. and 6.30 p.m. on Saturdays. It is available at all offices and news agencies of the *Chronicle Telegraph*, the Pittsburgh Railways' 30 ticket agencies and the Equitable Sales Company offices. More than 3,500 youngsters swamped offices to procure combination pass and admission tickets for the Tech-Adrian game on Oct. 9. These grid fans swelled the receipts of the Pittsburgh Railways by $450. On Oct. 16, when the University of Pittsburgh played Colgate, it is estimated that the youthful fans turned in $800 to the local property. On this day the usual "kick-off" thrill was enhanced by the assigning of a corp of special cheer leaders recruited from the university staff to the children's sections. Records do not show how many of the youthful spectators decided on that day just what their life work would be, but judging by their enthusiasm for the art of cheering and their ability to translate their ardor into husky yells the universities will not lack for any such boosters when a few more autumn solstices come around.

Pitt Stadium will again welcome the juvenile members of the Post Athletic Club on Oct. 30, when Pitt meets Westminster, and again on Nov. 11, for the Tech-Juniata game, proving that in Pittsburgh, anyway, at least four thrills come in a lifetime. Of course, the same reservations hold good—you must be still sixteen if not sweet, and you must have that good old quarter or five nickels.

Through British Eyes

A Recent Interested Observer of American Affairs Was Mr. Bellamy of Hongkong

L. C. F. Bellamy, a delegate from Hongkong to the convention in Cleveland, took advantage of his trip to the United States to visit a number of properties other than that at Cleveland. From Cleveland he went to Philadelphia to study co-ordinated transit, but more particularly to study the trackless trolley line in that city. There is agitation at Hongkong for transportation by bus, but Mr. Bellamy does not look with sympathy on that vehicle for use there. Many difficulties would attend the operation of gasoline passenger vehicles in public hire there, but the principal objection to the use of the bus is on the basis of the cost of petrol. The price of this fuel in Hongkong is about three times the price in England, and that price, as is well known, is much more than the price in the United States.

On the other hand, Mr. Bellamy is not completely sold on the trackless trolley, but he favors that form of transport under the conditions at Kongkong, and he may so report to his directors. His visit to the United States is a flying one and before the end of the month he expected to be on his way across the Pacific. His plan was to stop in Chicago to watch again the operation of the system there, but he did not intend to visit New York, in which conditions on transport are regarded by him to be abnormal—abnormal in that they do not represent average conditions.

Mr. Bellamy is very well informed on American political conditions, both national and local, and manifested the Briton's natural curiosity about the effectiveness of prohibition enforcement with all its anomalies. As a boy he visited the United States with his father, who was then a British municipal tramway operator, but he remembers distinctly that at a meeting at that time at which his father spoke surprise was manifested that politics was not allowed to enter into consideration in the operation of the municipal undertaking. He is interested in the operation of the Detroit and Seattle municipal systems, and was curious to know how such operation, unusual in the United States, was working out.

He was greatly impressed with the exhibits at Cleveland, particularly the car exhibit, and he carried away with him many new thoughts on modernization. Of course, modernization is with him more an economic study than an actual problem, but he is not without economic problems, although the making of money is not one of them. His system has no securities outstanding except common, or ordinary shares, as the English say, and last year paid a dividend of 20 per cent. The operating ratio at Hongkong is much less than 50 per cent. The platform labor problem does not bother him much. but about a year ago, at the time of the Hongkong uprising, he was required to recruit a new operating force. Along these lines Mr. Bellamy said that he was following with great interest the attempts being made by Mr. Mitten to mutualize the Philadelphia system. He expects to report personally to his board in London next year. This he does every third year.

Rail and Bus Fares Increased in Norfolk

The Norfolk, Va., City Council passed two ordinances on Oct. 26 granting the Virginia Electric & Power Company, subsidiary of Engineers Public Service Company, increases in bus and trolley fares to a 10-cent cash fare, 8¾-cent ticket rate and $1.50 weekly pass. The ordinances also provide for partial rerouting of the transportation system for the purpose of unification and improved operating economy.

Seattle Survey Report Nearly Ready

The financial survey of construction costs of the proposed project of linking the municipally owned lines of Seattle, Wash., with a system of rapid transit is now nearing completion, according to a report of the transit committee of the Seattle city planning committee. Engineers of the Seattle Municipal Street Railway are also engaged in checking figures of the original report which was compiled by the transit committee after more than a year of exhaustive research into nation-wide street railway transportation conditions. Members of the committee point out that while the plan of Superintendent of Utilities Jackson has its advantages, such as cutting down expenses in elimination of certain duplicating routes and non-profitable lines, it cannot assist in building up patronage. Superintendent Jackson's plan calls for turning cars back at Pike Street.

White Car in Joliet Urges "Safety First"

In the hope of lessening the number of street accidents, Joliet, Ill., has launched a "safety first" campaign, and is constantly operating a street car, painted white, which carries numerous safety slogans, calculated to arouse adults and children to the necessity for thinking before crossing a street, or taking any other step in which the element of danger enters. It is believed that this campaign has had excellent effect.

Cash for Suggestions on Puget Sound Property

As a result of the interest taken by employees of the Puget Sound Power & Light Company, Seattle, Wash., in the suggestion contest which closed on June 30, it has been decided again to offer prizes aggregating $1,000 to be completed for during the period from Oct. 1, 1926, to May 1, 1927. This competition will be open to every employee.

The prizes will be awarded by a committee consisting of the vice-president, the seven district managers, the manager of the auxiliary operations, the manager of securities company and the personnel officer. The prizes follow:

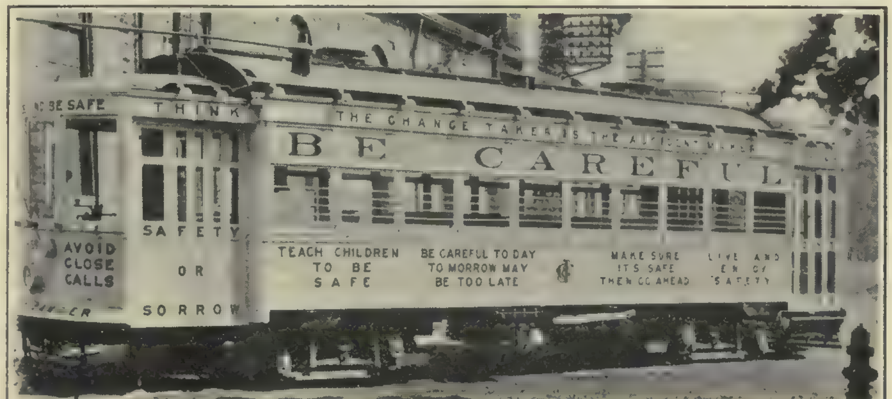
First prize	$400 in cash
Second prize	250 in cash
Third prize	200 in cash
Fourth prize	100 in cash
Fifth prize	50 in cash

Suggestions or plans submitted are to cover subjects which are of such a practical nature that adoption by the company would probably result in an increase of gross earnings or a decrease of operating expenses, or a well-defined company policy which will clearly indicate increased efficiency throughout the organization or better relations with the public in the territory served.

City Rehabilitates Phoenix Railway

Gradually the railway system in Phoenix, Ariz., is finding itself again. The system, now under municipal control, is to be improved, both as to rolling stock and schedules, just as soon as possible. The policy of the city administration is to furnish the very best service possible commensurate with a policy of economy, according to City Manager Rieger. The system is now being operated on a 5-cent fare.

The entire property, including rolling stock, right-of-way, machinery, equipment and real estate, was purchased outright by the city from the former owners for a lump sum of $20,000, which has been paid in full. The purchase followed appraisals made by the city and the then owners of the railway. The sale was the climax to a long, perplexing period in which no solution could be found for putting the railway, loaded down with paving and other requirements, on its feet. The problems in that city and the subsequent sale were referred to previously in the ELECTRIC RAILWAY JOURNAL.


BE SAFE
THINK
THE CHANGE TAKER IS THE ACCIDENT MAKER
BE CAREFUL
SAFETY
OR
SORROW
AVOID CLOSE CALLS
TEACH CHILDREN TO BE SAFE
BE CAREFUL TO DAY TO MORROW MAY BE TOO LATE
MAKE SURE ITS SAFE THEN GO AHEAD
LIVE AND ENJOY SAFETY

Joliet's Harbinger of Safety in White Garb

Car Line to Toronto Island Favored

Although the stage has been set for some time for the taking over of the Island Ferries by the Toronto Transportation Commission, Toronto, Canada, the Board of Control is in favor of a continuation of the service furnished by Lawrence Solman until the end of the year. Meanwhile how to make the Island of Toronto, across the bay, more accessible to the people living in the city is one of the questions being debated along with radials and one-man cars. Several representatives of public affairs in Toronto have approved of an electric railway line, although there is a difference of opinion over the question of admitting buses through the construction of a proposed boulevard. It is maintained by some that the proposed extension of the Lake Shore Boulevard to the island would be too costly and that motor traffic would impair the safety and quiet of the resort. Comptroller Joseph Gibbons favors the operation of street cars if the government constructs a bridge at the channels. George Wilson, president of the Board of Trade, is of the opinion that a railway and a boulevard around the island should be constructed in the future. John O'Connor, at one time a member of the Harbor Commission, says that discontinuance of the ferry service would take away from the island one of its greatest attractions.

Rules for School Tickets at Ottawa Reiterated

To guard against the abuses which tend to rob every privilege of its value, the Ottawa Electric Railway, Ottawa, Ont., has been compelled to insist on the fundamental condition under which school tickets are issued, namely, that there be an adequate certificate to the fact that the intending passenger is a pupil at a recognized school and under fourteen years of age.

The company reminds its patrons that the person best qualified to give this certificate is the teacher at the school, but there are occasions when it is more convenient for one of the parents to call for the ticket. The company will in future accept the certificate of the parent in lieu of that of the teacher.

School tickets at Ottawa are valid only between the hours of 7 a.m. and 5 p.m. At all other times the regular fare must be paid, according to the height of the passenger.

Advantages for Employees in Insurance Plan

Co-operation between the management and the personnel of the New York Railways Corporation, known as the "Green Lines," New York, N. Y., has resulted in the adoption of a program which is expected to cover between 2,000 and 2,500 employees of the company for more than $2,000,000 of life insurance, as well as health and non-occupational accident protection. Each employee participating in the group plan receives $1,000 life insurance. In case of sickness from any cause, or injury while away from work, he will receive, under the health and accident policy, a weekly benefit. These payments will start on the eighth day of disability and will continue for a maximum of thirteen consecutive weeks. The life insurance also creates a temporary fixed income for the employee himself if he becomes totally and permanently disabled before age 60. Such employee will receive the full amount of his insurance in monthly installments. During the disability period premiums will be waived by the Metropolitan Life Insurance Company, which is underwriting the group plan.

Progress on Everman Plan Made in Dallas

The Dallas Railway, Dallas, Tex., has completed practically 50 per cent of its improvement program, ordered under the Everman Plan. Started only five months ago, the work of relaying tracks, extending car lines and carrying out other improvements has already been accomplished. The improvement program, recommended by Mr. Everman, city supervisor of public utilities, calls for an expenditure of $1,450,000.

News Notes

Fund Will Pay for Route Changes.—The United Railways & Electric Company, Baltimore, has provided a fund to pay for the construction work necessary to carry out the route changes which have been recommended by the Baltimore Traffic Survey Commission and approved by the Maryland Public Service Commission. The cost of construction work will be about $15,000. The changes are embodied in the first group considered by the commission. Five additional groups, each involving numerous changes, are to be acted upon later.

Men Protest One-Man Cars in Montreal.—Employees of the Montreal Tramways, Montreal, Que., have registered a protest against the new one-man system and have authorized the business agent of the Montreal Tramways Employees' Union to draw upon union funds, if necessary, for a campaign in the press and elsewhere against the cars. The protest is being sent to the company.

One-Man Cars in Heart of Berkshires.—The Berkshire Street Railway began the operation of one-man cars between Pittsfield and North Adams, Mass., and north to Bennington, Vt., on Oct. 16.

Rapid Transit Over Steam Tracks Under Consideration. — The Boston Elevated Railway, Boston, Mass., is considering plans to operate a rapid transit line over the tracks of the Boston & Maine Railroad from North Cambridge to Somerville Junction. This is the present right-of-way of the Central Massachusetts branch of the Boston & Maine, which is being diverted to another route. The idea is similar to the arrangement now in use on the Shawmut branch of the New York, New Haven & Hartford Railroad through Dorchester and Ashmont. The system suggested would operate from Somerville Junction through Somerville to connect with the main line of the Boston Elevated at Lechmere Square.

Damage to Havana Railway Negligible.—Speyer & Company, New York, have received advices from Frank Steinhart, president of the Havana Electric Railway, Havana, Cuba, that the company is again in full operation. Only negligible damage to the railway was caused by the hurricane.

$10,000 Music Appropriation Goes for Transit. — Mayor Kendrick of Philadelphia, Pa., will get the $10,000 he requested to engage J. Rowland Bibbins as expert in transit matters to advise him in the proposed negotiations with the Philadelphia Rapid Transit Company for a lease of the Broad Street subway. The finance committee has approved the appropriation and reported a bill to the session of Council. The $10,000 was found nestled in an item of $34,925 unused for music the past summer by the Park Commission. The Park Commission wanted all the money transferred to other park needs, but the finance committee appropriated the $10,000 and let the commission have the remaining $24,000 for uniforms, supplies and labor.

Terminable Permit Hearings to Be Resumed.—Senator Richard J. Barr, chairman, has called a meeting of the Illinois legislative terminable permit investigation committee to convene at the Palmer House, Chicago, on Nov. 8 to resume its hearings.

Grade Crossing Elimination Work to Start.—Immediate steps are to be taken by the Board of Public Works in Louisville, Ky., looking toward the elimination of grade crossings in that city. Members of the board have been in conference with Mayor Will discussing plans for speeding up this work. Edward J. Miller, chairman of the board, said that the board was becoming impatient at the long delay in action on the part of those who are blocking the work. Disagreement over rerouting of cars of the Louisville Railway has been partly responsible for the delay.

Course in Traffic Management. — A course in "Traffic Management" has been started by the Pacific Electric Railway, Los Angeles, Cal., under the tutorship of E. W. Hill, educational director. Each Wednesday from 7 to 9 p.m. a limited number of employees will learn the principal phases of traffic management, including classification, tariffs, rates and claims, with the practical side expressed by the men engaged in that work. As planned the course will run to June next.

New Edition of Boston Guide Book.—A new edition of the familiar and useful Guide and Information Book, issued originally in 1924, is being prepared by the Boston Elevated Railway, Boston, Mass. The general plan of the new edition is the same as that of the old one, but the cover and maps are in colors. The use of different colors for the several kinds of transportation lines will make it easier for employees to explain to patrons how to get from place to place.

Would Cancel Franchise.—The Buffalo City Council has voted to revoke the franchise of the International Railway, Buffalo, N. Y., for the operation of cars in Grant Street between Hampshire Street and Military Road, a distance of almost 2 miles. The resolution for revocation of the franchise was introduced by Mayor Schwab because of the alleged failure of the company to repair its tracks and roadbed in the street as ordered by the Public Service Commission. The company questioned the authority of the state utilities board to issue such an order and now the International is questioning the authority of the City Council to revoke its franchise in the street. The legal department of the company indicated it would apply to the courts for an injunction if the city makes any attempt to remove the tracks. The city already has authorized contractors to start repaving the street. The present move is in effect merely another attempt by the Mayor to embarrass the company.

What Leaders Think of Georgia.—"A Welcome Awaits You in Georgia" is the assurance given by the Georgia Railway & Power Company, Atlanta, Ga., in a 60-page pamphlet expository of the public sentiment in Georgia toward new industries and citizens as expressed by business and industrial leaders, newspaper editors, public officials and others.

One-Man Cars Under Fire in Toronto.—Agitation is prevalent in Toronto, Ont., against one-man car operation, but D. W. Harvey, general manager of the Toronto Transportation Commission, says if one-man cars are not run fares must be increased to give a service similar to that now in effect. On the other hand, if service had to be reduced, as it would under two-man operation, there would be a corresponding decrease in revenue. He says that safer and more convenient service can be rendered with one-man cars than with two-man cars and that several recent fatalities with one-man cars were not indicative of their being dangerous to operate. Following his report, however, operators recited dangers encountered during rush hours. Members of the local division of the Amalgamated reiterated their opposition to the one-man car and executives were instructed to act to protect the interests of the men.

Starts Eight-Car Trains on Another Branch.—Eight-car train service, replacing four and six-car local expresses, during the rush hours on the Lake Street division of the Chicago Rapid Transit Company, Chicago, Ill., was started on Oct. 1. The change as effected will give residents of the adjacent communities of Austin and Oak Park faster elevated service than they have had since the line opened in 1893. The new service is a part of a program of speeding up on the entire Rapid Transit system, the longer train operation having been made possible by reason of the platform extension work which has been under way for several months. The first eight-car trains of the Rapid Transit Lines were placed in operation on the Evanston-Jackson Park division early last spring.

Foreign News

London Bus Restriction Held Invalid

By a vote of two to one the Ealing Bench of Magistrates, London, England, recently dismissed a summons against an independent bus owner for alleged failure to comply with the restrictions on operation along Uxbridge Road between Shepherd's Bush and Uxbridge. An account of the promulgation of these regulations by the Minister of Transport acting under powers conferred by the London traffic act of 1924 was published in ELECTRIC RAILWAY JOURNAL for April 10. The defendant acquired a bus in March, 1925, and was assigned to this route by the Ministry of Transport. Later, he was excluded by the new regulations. He admitted, however, that before commencing operation he had been warned that such an outcome was likely. Counsel for this operator, however, contended that the Minister of Transport had exceeded his authority in attempting to enforce these rules. The regulations, he said, were unreasonable, unjust and involved a gratuitous interference with the rights of citizens. After a short consultation, the magistrates announced their decision dismissing the summons. It is expected that an appeal will be made against the decision. Meanwhile, the independent bus owners have decided to continue operation of full service between Uxbridge and Shepherd's Bush.

Rome to Have Subway

Construction of 27 miles of subway lines will soon be under way in Rome. A commission appointed by the Italian government has just completed the plans, after a thorough tour by it of the city in order that archaeological ruins may be conserved for future generations. The first unit of this underground project will be completed within the next ten years. The two principal lines will cross each other at the Piazza Santi Apostoli, the first one running in an east-westerly direction from the railway station quarter of the city to the Prati and the St. Peter Square and the other one from the Via Flaminia to San Paolo, the starting point of the electric railway to Ostia. In the future a line to cover the south of Rome will start from St. Peter Square to Janiculus and Trastevere, crossing River Tiber at the Sublicius bridge and extending by way of San Paolo, the Square of Laterans and the Porta Maggiore to San Lorenzo and the Cemetery.

Electrification in Switzerland Progresses

Operation of the new electric road connecting the four Swiss cities Basle, Brugg, Baden and Zurich will begin in November. The time for the express trains between Basle and Zurich will be reduced by eighteen minutes and that of local trains by 29 minutes as a result of the change from steam to electricity.

Approximately one-third of the Swiss railroad system is now electrified, or 590 miles out of a total of 1,828 miles. This is following out a still more extensive program which has been discussed in earlier issues of this paper. One of the chief factors for transition of systems is shown in the following table of increase in traffic during the last few years:

	Freight, Metric Tons	Passengers Carried
1925	16,436,630	101,827,814
1924	16,599,201	96,486,306
1920	15,829,742	86,080,314
1913	14,614,781	91,649,336

Railroad Electrification Work in Austria Progressing

Progress is being made with the electrification of the Austrian Federal Railways. Freight trains at the present time travel at a speed of 20 m.p.h., compared with 9½ miles in the era of steam transport. Great acceleration of traffic has also been accomplished in the case of passenger trains, although electricity has not yet been fully used owing to the short lengths of the lines which so far have been electrified. The Innsbrück-Bludenz line, for example, is only 85 miles long and the changing of locomotives causes a considerable loss of time. The lines that are now being constructed are Salzburg-Worgl, Kufstein-Worgl and Innsbrück-Brenner, which measure a total of nearly 190 miles (double track), with the exception of the single track Kufstein-Worgl line (9 miles). Current is supplied to these lines by the Mallnitz and Stubach electrical power stations. Some 47 electric locomotives have so far been ordered, all from Austrian firms.

Railway Progress in India.—The Great Indian Peninsula Railway has completed its harbor branch from Victoria Terminus to Thana. Progress is reported, too, on the main line running between Sandhurst Road and Kalyan, which will be completed by the end of next year. It will provide through electric service from Victoria Terminus to Kalyan. The plans as outlined provide for electrification of this line as far as Poona by 1929 and to Igatupuri in 1930.

Manchester's Anniversary Shows Many Improvements.—Since the first electric car ran in Manchester, 25 years ago, there have been put into service 903 cars and 58 buses. To house 230 of these cars the City Council is erecting a new shed which will cover 4¾ acres and is estimated to cost £170,000. During the last six years an increase of 38 miles of track has been made to the 212 miles of the tramway system.

Shops for Liverpool.—Liverpool City Council is now constructing tramway repair shops at a cost of £385,000 to occupy 9 acres.

Recent Bus Developments

Steam and Electric Road Opposed

Proposal of Railroads in Pennsylvania to Run Buses in Electric Railway Territory Brings Protest

Powell Evans, president of the Schuylkill Railway and the Schuylkill Transportation Company, Girardville, Pa., published a statement on Oct. 20 in opposition to the plans of the Pennsylvania Railroad and the Reading Company for establishing bus service in 55 and 24 counties, respectively. Besides putting out of business existing transit and bus lines, Mr. Evans points out, the railroads will probably increase their rates.

According to Mr. Evans steam railroads in Pennsylvania are prohibited by state laws from operating directly or indirectly either passenger or freight service over the public highways. He says that if the Pennsylvania Railroad and the Reading Company are permitted to carry out their programs for operating bus lines in a large number of counties in the state, the result will be the absorption by the steam lines, on their own terms and values, of virtually all competing local and bus transport throughout the state.

Mr. Evans' statement may be regarded as a spirited reply to a statement issued about a week ago by the Reading Company in an attempt to justify its ambition to run buses. Governor Pinchot recently refused to approve charters giving subsidiaries of the Reading Company and the Pennsylvania Railroad the right to operate buses on the state's public highways. In reply to this, the Reading Company declared that the railroads had just as much right as any one else to use these roads, inasmuch as they, the railroads, contributed to the support of the highways. In the meantime, the Reading Company is proceeding serenely with its plans for bus operation, apparently awaiting the day when Governor Pinchot shall have passed out of office.

In explaining the trolley and bus situation in Schuylkill County in particular, and throughout the state in general, Mr. Evans stated that the Schuylkill Company has experienced since the war a constant shrinkage in receipts and a constant increase in expense caused by automobile use and "below-cost railroad competition" from the steam railroads. The Schuylkill Company, he says, was established in 1892 and operates about 50 miles of trolley and bus routes through the upper two-thirds of Schuylkill County and serves about 180,000 population from Pottsville north. Its total capital is $2,500,000, or less than the appraisal accepted by the Public Service Commission for a rate basis, and it is almost entirely owned by residents of Philadelphia and eastern Pennsylvania, who receive barely 3 per cent per annum on their investment in the property. He declares that the trolley and bus lines both pay their full share of taxes and their security holders are as fully entitled to protection and support in their rights and investments as are those of the steam lines. Further Mr. Evans said:

> The steam lines are prohibited by Pennsylvania laws from operating directly or indirectly either passenger or freight service over the public highways, while to the contrary trolley lines are expressly empowered to do both. The Public Service Commission by its actions and decisions throughout its existence has consistently prevented unnecessary duplication of public service facilities and protected those it regulates from destructive competition; and the steam lines themselves have protested against such duplication in their own field, as witness the present fight against the proposed new Harriman steam line across this state, and their constant opposition to all bus applications.

In the next paragraph Mr. Evans calls attention to the fact that the Schuylkill Company in 1922 organized the Schuylkill Transportation Company as a bus subsidiary, and that the two companies have continuously provided throughout their community economic and efficient unified trolley and bus service of high quality and at reasonable rates. In fact, Mr. Evans adds, they have assisted the Reading Company upon request.

Finally, Mr. Evans says that the Schuylkill Company and generally the trolley and bus companies throughout the state "propose to resist to the utmost the unjustifiable aggression initiated by the steam lines against established, responsible and equally legitimate local competitors."

Councilmen Oppose Buffalo Bus Project

The City Council of Buffalo, N. Y., has failed to approve Mayor Schwab's plan for the extension of municipal bus lines. The commissioners indicated they would not vote for the expenditure of additional funds until the Mayor supplied detailed information regarding the costs and the terms of agreements he had proposed to make with various automobile companies and bus corporations.

The only information contained in the Mayor's municipal bus resolution called for the purchase of passenger buses from the Reo Motor Car Company at $5,525 each, buses from the White Motor Car Company at $10,887 each and also buses from the Dodge Company at $4,337 each. The contracts were to be somewhat similar to the Detroit rental-sale plan. The city was to pay the companies at the rate of 20 cents per bus-mile and guarantee each bus 100 miles a day, this sum to apply on the purchase price. In addition the city was to furnish gasoline and oil, pay for the driver and supply fire, theft and liability insurance.

A conspicuous opponent of the municipal bus plan was Commissioner Frank C. Perkins, the Socialist member of the Buffalo City Council, who for years has been advocating municipal ownership of all utilities.

Shore Line Would Purchase Calumet Coach Company

Permission for the purchase of the Calumet Motor Coach Company by the Shore Line Motor Coach Company, a subsidiary of the Chicago, South Shore & South Bend Railroad, is asked in a petition filed recently with the Indiana Public Service Commission by the railway subsidiary. The petition states that the coach lines operated by the two companies are in close proximity in the Calumet district and that "the interchange of traffic is such that public convenience will be served better if the operation of the routes is carried on by a single company." The purchase will make the Shore Line company one of the largest coach companies operating both interurban and city coaches in that section of the country. A total of 23 routes will be operated out of Gary, to Chicago and Grand Rapids, the northern terminus.

The capital stock of the Calumet Motor Coach Company was purchased last July from its former owners by the Midland Utilities Company, an investment company interested in other utilities in the district served. It holds a franchise to furnish motor coach transportation in Hammond. The Calumet company also operates two routes from Hammond, Ind., to Chicago. The Shore Line company operates through service connecting Chicago and Benton Harbor and Grand Rapids, Mich., also connecting Chicago and Gary and Valparaiso, Hammond and Chicago Heights and other northern Indiana points. The company has its headquarters at Gary. Both lines also operate an extensive chartered car service.

There will be no change in the personnel of the present Calumet company.

Combined figures of the unified coach company will show the following totals: 125 coaches, five garages, 318 employees, nearly 15,000 coach-miles operated daily, with approximately 25,000 passengers carried daily.

The petition also asks the right to issue no par value common stock to cover the cost of the motor coaches and equipment purchased by the Shore Line company. In a separate petition filed jointly by the Gary Railways and the Chicago, South Shore & South Bend Railroad, each of which already owns approximately half of the issued stock of the Shore Line Motor Coach Company, the two railroads ask the right to purchase equal portions of the new stock to be issued by the Shore Line Motor Coach Company.

The Place of the Bus Defined

Buses never will supplant street cars for mass transportation in St. Louis or any other city, in the opinion of the special committee on subways of the Board of Aldermen of St. Louis, which has been rendering all-embracing views upon subjects related to rapid transit for St. Louis, after a study of conditions in many large cities of the United States. In general the committee finds:

> The consensus of opinion seems to indicate that there is no place in any city, except possibly the few very largest cities,

for the bus in competition with street railways, because such competition inevitably renders adequate service by the railway impossible, if it does not actually ruin it, while after the ruin takes place the bus cannot handle the load, particularly during the rush-hour peak. Competition might, however, be justified where the street railway is backward and will not keep up with modern developments.

There is a sociological question involved in the difference between a 7-cent car fare and a 10-cent bus fare. The difference between these two rates means an average increase for transportation of about $50 a year a family. No doubt in any community 5 or 10 per cent of the families can easily absorb such increase, but the great multitude of the families cannot contemplate or undertake with equanimity an increase of $50 in the family budget; to avoid that the cheaper means of mass transportation by street cars in the larger cities must be continued in full vigor and at the least cost. This cannot be done if they be subjected to unregulated competition of favored, subsidized motorbus lines.

The extent to which buses in St. Louis have been favored and subsidized is indicated by the fact that they are permitted to charge a 10-cent fare while the railways are limited to a 7-cent fare; the railway company contributes to the city about 12 per cent of its gross revenues in various forms of taxation and paving costs, the bus company approximately 4 per cent; the bus company is not compelled to provide any particular quantity of service during the rush hours, but is permitted to choose the number of passengers for which it is willing to provide seats; the railway is compelled to provide a fixed number of seats and a fixed area of standing room for all the passengers and carries the burden; the buses wear out pavements provided by others; the railway pays for pavements used by others. There is no obligation on the bus company to continue service on any line.

Bus Must Prove Its Right to Exclusive New York Street

The Park Avenue Association of New York City has announced the appointment of the engineering firm of Fisk & Roberts, New York, to report on bus operation proposed on Park Avenue by the Board of Transportation. This association, on behalf of its members, has consistently opposed the granting of a franchise for a bus route on Park Avenue and has now retained its own experts to analyze the advantages and disadvantages of the city's plan for a route between 45th and 96th Streets on Park Avenue.

Terminal Urged for Manhattan

The building of a terminal for interurban buses in New York City, many of which are now run into the Times Square area, to lessen street congestion, was urged on Sept. 19 by the Forty-second Street Property Owners and Merchants Association. According to a survey made of mid-town Manhattan there are about 50 interurban bus companies sending between 500 and 600 buses daily into the Times Square area and out of it.

The study revealed the fact that throughout the day there is generally a minimum of 50 buses standing still in the streets. At certain hours the number reaches to almost 100.

Edwin W. Forrest, secretary of the Forty-second Street Property Owners and Merchants Association, said that the interurban bus had developed to the point where, unless it were controlled, preferably by the bus companies, it would interfere with other interests, which would not be slow to object.

Football Followers Handled by Buses in Bethlehem

Roomy buses are being used at Bethlehem, Pa., to meet the need of congested traffic and suddenly mobilized crowds of passengers. Bethlehem is an old city with narrow streets. Its planners evidently missed the fact that future years were to bring an amazing volume of automobile and trolley travel. It happens also that Bethlehem is the seat of Lehigh University and is a collegiate and scholastic sports center of considerable renown.

Bethlehem is served by the Lehigh Valley Transit Company, which covers with its lines a great area in eastern Pennsylvania. When a hill-to-hill bridge was completed last year, with its spans extending octupus-like in five directions to touch important sections, the railway, lacking permission to lay tracks, organized the Lehigh Valley Transportation Company as a subsidiary and established a fleet of ten buses.

With the coming of the football season it was found that terrific congestion occurred every Saturday and Sunday afternoon between the hours of 1 and 6 p.m. Lehigh University stadium attracts its thousands, the Bethlehem High School field is the Mecca for additional thousands and professional Sunday football, played on the Bethlehem Fabricator field, in a somewhat isolated section of the city, and several blocks removed from the nearest trolley line, has many followers.

The Lehigh Valley Transit Company officials met with the executives of Bethlehem and offered a plan of running buses in place of trolleys during these rush periods. It met with instant approval. The Public Service Commission agreed to the proposal. As a result ten buses now serve the passengers whenever an event of any magnitude is held. They are diverted from the hill-to-hill bridge runs for the extensions to the playing fields, during periods when the crowds are going to the fields and returning. Traffic congestion is in consequence tremendously relieved. Patronage is always at capacity. When the main crowds have been taken care of the buses are returned to their usual runs. The ten routes are designed to cover every important part of the city.

Bus Service Arranged for Vancouver, Wash.

Bus service in Vancouver, Wash., will be operated by T. L. Lineham and associates, who have been granted an exclusive franchise by the City Council. A 30-minute schedule will be maintained. The fare will be 10 cents for adults, 5 cents for children under seven and 5 cents for school children on school days. The fare from any section of Vancouver to Portland by bus and street car will be 25 cents and by stage to Portland 30 cents.

Following favorable action by the State Department of Public Works on a petition of the Clark County Development Company to discontinue railway service between Vancouver and Sifton, the cars have been taken off this run. The order releasing the company has been signed by the Clarke County Commissioners. The franchises canceled were granted the Vancouver Traction Company on Jan. 15, 1909, and taken over by the present company on Feb. 15 of the same year. Service will be continued in the city until bus lines are established.

Both Companies at Lincoln Get Permits

The City Council of Lincoln, Neb., has voted to give each of its railways, the Lincoln Traction Company and the Omaha, Lincoln & Beatrice Railway, an interurban, what it wants. The interrurban made the first request, which included a loop that kept it within its old downtown business section boundaries. Later it amended this, at the request of business men, to make a wider detour, entering what the traction company officials say is the cream of its territory. The traction company then asked for permission to run bus lines into the suburb of University Place, which has just been taken into the city, and which is the starting point of the interurban buses. The interurban protested against this, saying it had not sought to invade traction territory, and the traction company replied with a challenge of this statement. The interurban has buses on the ground and started them, after permission had been granted, but without changing the downtown routing. The traction company received the permit and will have its buses in operation soon.

New Service to Picturesque Poconos

A drastic change will be made on Nov. 1 in the operation of one of the most unusual railways in the United States. This is the line run by its employees, who leased it a year ago from the Bangor-Nazareth Transit Company.

The road extends from Pen Argyl to Nazareth, passing through Wind Gap. It caters mostly to passengers who make short trips to the resorts in that section during the summer. The most notable of these places is Saylor's Lake, near Delaware Water Gap and the Poconos.

The employees now intend to discard the three trolley cars remaining in service and will install a bus line. Two buses have already been received for operation over the splendid cement highways spread over the entire region. Service will also be instituted to Bangor. The bus line will make connections with the Lehigh Valley Transit lines at Nazareth and transport passengers into the Pocono foothills on hourly service.

Bus Field Left to Railway

The petition filed with the Public Service Commission of New York by the County Transportation Company, Inc., for permission to operate bus lines in White Plains, the villages of Scarsdale, Elmsford and Tarrytown and the town of Greenburgh, Westchester County, has been withdrawn by the petitioner and the records closed with the commission.

This company obtained local consents in all municipalities except in the village of Elmsford. Consents of the city of White Plains and the village of Scarsdale were not to become operative unless consents were obtained from all other municipalities and operation commenced within 60 days and in the village of Tarrytown within 30 days.

The proposed route would follow the line of the Westchester Street Railroad, and the application was opposed by the receiver of that company. Subsequently this line was acquired by the Union Railway, which also opposed the petition. Several hearings were held and on Sept. 15 the attorney for the petitioner withdrew the application.

Buses Into the Saucon Valley

A bus line may replace the trolley service of the Bethlehem Transit Company, South Bethlehem, Pa., across the Lehigh mountains and into the Saucon Valley. This particular branch of the Bethlehem Transit Company lines serves a widely scattered community, in which traffic at certain times is almost nil, so that the possibility of running trolleys on a faster schedule or providing better service by car are discounted. Private individuals are seeking permits from the Public Service Commission to serve this territory, but the Bethlehem Transit Company will doubtless file a petition of its own.

Weekly Passes on Lordship Bus Routes

The Connecticut Public Utilities Commission has granted permission to the Lordship Railway to institute a system of weekly passes on its bus route between Lordship and the Plaza, Bridgeport, with the limitation that the weekly passes will be issued for a trial period of one year. The finding of the Public Utilities Commission allows the company to issue weekly passes at $1 each for use on the bus route between the Plaza at Bridgeport and Lordship or Avon Park in Stratford, and passes at 50 cents for use between Hollister Bridge and Lordship or Avon Park. The new system will go into effect Nov. 1.

The Lordship Railway operates a bus line from the Plaza, Bridgeport, to Lordship in Stratford, or Avon Park in Stratford, a round trip to either point covering a distance short of 9 miles.

Would Consider Bus Request.—The Milwaukee Electric Railway & Light Company has taken under advisement the request of the West Racine, Wis., Business Men's Association asking for the extension of the railway's bus system to serve West Racine, a rapidly developing suburb now without any form of transportation service. The proposed line would also touch Mygatt's Corners, where 115 families have signed a petition signifying their intention to support bus service.

Service Increased in Evansville.—Bus service in Evansville, Ind., supplied by the Southern Indiana Gas & Electric Company for the past six months, has met with considerable success, so that the company has put on four new buses to connect with the city cars in remote sections of the city. The new buses have a capacity of about 35. They will not be assigned to any particular routes, but will be used to handle peak crowds.

Lines Extended Into New Territory.—Two suburban bus lines have been extended into growing residence districts by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. The bus line which operates as a feeder to the Third Street line at the end of Green Bay Avenue now operates ½ mile beyond its former terminal. Under the new plan buses will operate until midnight instead of discontinuing service at 10 p.m. The Clement Avenue bus line, a feeder to the Oakland-Delaware line, has been extended from its former terminal at the Nash Motor plant to St. Francis and Second Avenues in St. Francis. The new areas served are sparsely settled.

Bus Line Planned.—The Gardner-Templeton Street Railway, East Templeton, Mass., is being discontinued and the directors have sold the rails and wire to a Gardner junk dealer. The management will put on a bus service to replace the trolleys.

Specific Stopping Places for Boston Buses Wanted.—Edward Dana, general manager of the Boston Elevated Railway, Boston, Mass., is seeking a revision of the city traffic regulations to designate specific stopping places for buses operated by the company. At a recent conference with the Boston Street Commissioners, Mr. Dana suggested that buses should be provided with certain exclusive stopping points for the convenience of patrons. At the present time there are points where it is almost impossible for the buses to take on passengers because of private autos parked in the way. It has been necessary for the buses to stop in the midst of moving traffic to allow patrons to alight.

New Bus Fare in Effect.—The fare on the Riverside Drive bus line of the Los Angeles Motor Bus Company, Los Angeles, Cal., was made 6 cents without transfer privileges, effective on Oct. 7. The former fare of 10 cents with transfer privileges to and from the Los Angeles Railway and Pacific Electric Railway lines remains the same.

Purchases Jitney Lines.—President W. Scott Eames of the New Haven & Shore Line Railway, Guilford, Conn., has announced the purchase of the operating rights of the Waterbury Jitneys & Taxis, Inc., operating a bus line between New Haven and Saybrook. The additional line will be absorbed in the regular operating schedule of the Shore Line. The New Haven & Shore Line Railway operates 37 miles of line.

Would Investigate Interurban Bus Status.—The St. Louis, Mo., Board of Public Service has instructed Director of Streets and Sewers Brooks to investigate the status of interurban bus lines now using the streets of the city. Numerous complaints have been made that many bus lines are operating without city permits. A city ordinance requires all bus lines to obtain city permits which specify what streets they may use. When this ordinance was originally passed seventeen bus line permits were taken out, the majority for the People's Motorbus Company. Several permits have been issued since that time, but many bus companies have come into the city without making an attempt to comply with the ordinance.

New Bus Service Started. — The Hamburg Railway has started the operation of five de luxe passenger buses between Buffalo and Hamburg, N. Y., under a certificate of convenience and necessity granted by the Public Service Commission. This is the first of three bus lines to be started by the Hamburg Railway between Buffalo and suburban points in western New York and is known as route A-1. Motor coaches will operate on an hourly schedule. No local passengers will be carried in the city of Buffalo. The buses have a capacity of 29 passengers. The round trip is 75 cents, with a one-way fare of 40 cents. Commutation books will be sold on a basis of 30 cents a trip.

Bus Routes Authorized.—The Scranton Bus Company, a subsidiary of the Scranton Railway, Scranton, Pa., has received a certificate from the Public Service Commission to operate buses from Dunmore Corners through Green Ridge Street to Providence Square. This is a crosstown bus line serving citizens of Dunmore and north Scranton. A certificate has also been secured to extend the bus line now operating from the Throop Boulevard section to the center of the city, through Wyoming Avenue to Lackawanna Avenue.

Prohibits Restraining Orders Against Independents.—A writ to prohibit Judge William Kittinger of the Circuit Court at Anderson, Ind., from issuing restraining orders, injunctions or contempt of court citations against four independent bus operators in Muncie, Ind., has been issued by Judge David A. Myers, chief justice of the Indiana Supreme Court. The petition follows a controversy between Arthur W. Brady, receiver for the Union Traction Company, and the Muncie bus operators. The traction officials asserted that the Muncie operators are running illegally. Attorneys for the bus men declare they carried the matter to the Supreme Court because they feel that court action should be in Delaware County, where the buses are operating, and not in Madison County, where the receivership was established.

Extension of Service by Buses.—The Northampton Street Railway, Northampton, Mass., has been granted authority by the towns and cities involved to run buses between Northampton and Williamsburg. Between Leeds and Williamsburg buses will be operated entirely and the trolley service will be abandoned. Between Leeds and Northampton buses will be used to cooperate with the railway service. The Aldermen of Northampton granted licenses after some dispute regarding the fare. The licenses issued also include an order for a reduction in fare between Northampton and Williamsburg as offered some time ago by the Northampton Street Railway.

Financial and Corporate

Interborough Gross and Net Up

Increase in Net Corporate Income for Year Ended June 30 Was $2,278,253 —Earnings Statements Compared

Gross operating revenue of the Interborough Rapid Transit Company, New York, for the year ended June 30, 1926, was $61,708,815, compared with $58,418,991 last year, a gain of $3,289,824, or 5.63 per cent, the result of a gain on the subway division of $3,213,036, or 8.15 per cent, and a loss on the Manhattan Railway division of $76,788, or 0.40 per cent. The gain in the revenue from the transportation of passengers was $2,047,021 and the gain in the other street railway operating revenue $1,242,803, principally from advertising, which shows an increase of $1,227,328 over the previous year.

COMPARATIVE INCOME ACCOUNT OF INTERBOROUGH RAPID TRANSIT COMPANY

Year Ended June 30	1926	1925	Increase
Gross operating revenue	$61,708,814	$58,418,990	$3,289,823
Operating expenses†	33,540,812	33,088,385	452,427
Net operating revenue	$28,168,001	$25,330,605	$2,837,396
Taxes	3,350,782	3,299,589	51,193
Income from operation	$24,817,218	$22,031,015	$2,786,203
Non-operating income	276,979	292,200	*15,220*
Gross income	$25,094,198	$22,323,216	$2,770,982
Income deductions	21,669,158	21,176,428	492,729
Net corporate income	$3,425,040	$1,146,787	$2,278,252
Add:			
Surplus at beginning of year	$1,529,863	$391,534	$1,138,329
Profit and loss account—Net changes during the year	13,865	*8,457*	22,322
Totals	$1,543,728	$383,076	$1,160,652
*Surplus at end of year†	$4,968,768	1,529,863	$3,438,905

*Stated exclusive of accruals under Contract No. 3 and related certificates payable from future earnings but with full deduction for sinking fund on first and refunding mortgage bonds, the payment of which is under the "Plan of Readjustment," postponed for five years from July 1, 1921, provided an amount equal to such postponed sinking fund be expended for additions or improvements to the property.

†Stated exclusive of expenditures for maintenance in excess of contractual provisions.

Operating expenses with maintenance and depreciation included on the basis of contractual provisions were $33,540,813, compared with $33,088,385 last year, an increase of $452,428, or 1.37 per cent, the result of an increase of $656,713, or 3.04 per cent, on the subway division and a decrease of $204,285, or 1.77 per cent, on the Manhattan Railway division.

The net operating revenue was $28,168,002, compared with $25,330,606 last year, an increase of $2,837,396, or 11.20 per cent, the result of a gain on the subway division of $2,556,323, or 14.32 per cent, and a gain on the Manhattan Railway Division of $281,073, or 3.76 per cent.

The total amount of taxes was $3,350,783, compared with $3,299,590 last year, an increase of $51,193, or 1.55 per cent; the subway division shows an increase of $79,877, or 9.56 per cent, while the Manhattan Railway division shows a decrease of $28,684, or 1.16 per cent.

Income from operation was $24,817,219, compared with $22,031,016 last year, or an increase of $2,786,203, or 12.64 per cent, the result of a gain on the subway division of $2,476,446, or 14.55 per cent, and a gain on the Manhattan Railway division of $309,757, or 6.17 per cent.

Non-operating income was $276,979, as against $292,200 last year, a decrease of $15,221, or 5.21 per cent, the result of a decrease on the subway division of $21,573, or 10.10 per cent, and an increase on the Manhattan Railway division of $6,352, or 8.08 per cent.

Gross income was $25,094,198, compared with $22,323.216 last year, an increase of $2,770,982, or 12.41 per cent, the result of a gain on the subway division of $2,454,873, or 14.25 per cent, and a gain on the Manhattan Railway division of $316,109, or 6.20 per cent.

Income deductions were $21,669,158, compared with $21,176,429 last year, an increase of $492,729, or 2.32 per cent.

The net corporate income was $3,425,040, compared with $1,146,787 last year, an increase of $2,278,253.

Some $10,899,889 was spent during the year for maintaining the railroads, power plants and the rolling stock in good operating condition. This amount was $981,346 in excess of the contractual provisions and when deducted from the net corporate income leaves a balance for the year of $2,443,695, compared with a deficit the previous year of $345,508.

The number of passengers carried was 1,130,484,647, compared with 1,089,544,225 last year, an increase of 40,940,422, or 3.76 per cent, the result of a gain on the subway division of 47,459,401, or 6.44 per cent, and a loss on the Manhattan Railway division of 6,518,979, or 1.85 per cent.

A net expenditure of $3,087,693 was made during the year for additions, betterments and replacements. This amount includes the company's contribution toward construction and equipment under Contract No. 3 with the city and the related certificates, balance of cost of 150 additional subway motor cars and additional shop and power facilities to provide for operation of additional subway cars.

The comparative income account for the years ended June 30, 1926, and 1925, is contained in the accompanying table.

The system is made up of 378 miles, of which 237 is elevated lines and 141 subway.

Michigan Road to Discontinue After Foreclosure

The Grand Rapids, Holland & Chicago Railway went under the hammer before Judge Clarence W. Sessions in United States District Court at Grand Rapids, Mich., on Oct. 20, with the Hyman-Michaels Company, Chicago, the successful bidder. Its offer of $227,500 for the entire road and equipment was accepted when no other bids were made.

The railway went into the hands of receivers in June, 1924, on petition of the Continental & Commercial Trust & Savings Bank, Chicago, the trustee under a deed securing $1,500,000 of Grand Rapids, Holland & Lake Michigan Railway first mortgage 7 per cent bonds (extended) on which interest was defaulted on Feb. 1, 1924. The Grand Rapids, Holland & Chicago Railway was incorporated on July 19, 1904, as successor to the Grand Rapids, Holland & Lake Michigan Railway. It owns 76 miles of track. In 1916 the road was leased to the Michigan Railroad for five years. This lease was renewed for another five years at its expiration, but on Jan. 1, 1924, the lease was canceled and the road returned to the owners.

The sale is, of course, subject to the approval of the court. Meanwhile service will be continued, but the prospect is that after the successful bidder is fully qualified and title passes the road will discontinue.

New Kansas City Mortgages Filed for Record

The Kansas City Public Service Company, new owner of the railway at Kansas City, Mo., has filed a mortgage under which bonds will be issued in an initial amount of $12,465,200. The mortgage is on the properties of the defunct Kansas City Railways, title to which has been transferred to the new company and is of the type that may be enlarged at intervals as the need may arise.

The new owners of the property will distribute a total of $11,150,755 of the bonds among themselves. The remaining bonds of the new issue, having a total face value of $1,314,444, will be remitted to the group of personal injury claimants, for whom Senator James A. Reed arranged a settlement with the federal court at the time of the receivership litigation.

The issue of bonds is being arranged on the basis of a 30-year maturity, but they will be recalled and exchanged for eighteen-year bonds in the event the franchise extension fails if a public referendum is held.

Also on Oct. 18 a similar mortgage on the Wyandotte Railways, a subsidiary operating in Kansas City, Kan., was filed there. The mortgage, which will be held by the Kansas City Public Service Company, provides for a bond issue of $1,750,000 face value on the Wyandotte County properties of the company. Thus the initial bond issue of the Kansas City Public Service Company represents a total face value of $14,215,200, secured by pledge of both the Kansas and Missouri properties.

Shall the Purchased Franchise Be Included in Property Value?

A hearing was held on Oct. 5 before the Court of Appeals of the District of Columbia in the case of the Public Utilities Commission against the Capital Traction Company, Washington, D. C. The case is on appeal from the decree of the Supreme Court of the District of Columbia fixing the fair value of the properties of the Capital Traction Company for rate determination purposes. F. H. Stephens appeared for the commission and George E. Hamliton and G. Thomas Dunlop for the railway.

An agreed statement of facts shows that the commission, after hearings made in 1919, found the value of the company's property as of 1914, and added thereto the cost of property acquired between that date and the date of valuation in 1919. This was conceded to be an error and the Supreme Court of the District of Columbia, having the entire record, revalued the property as of Jan. 1, 1925. On that date the court found the fair value to be $30,906,880, which included $5,150,000, the cost of franchise and other intangible elements.

The commission brought this appeal from the decree of the Supreme Court of District of Columbia, asking that the decree should be reversed and remanded with instructions to the court to eliminate the item of $5,150,000. The commission also sought consideration of historical cost or investment value and proper depreciation.

Counsel for the Capital Traction Company contended that the actual cost of the franchises and other intangible elements of value purchased from the Washington & Georgetown Railroad should be added to the reproduction cost new, as such actual expenditure was legal and necessary, and the stockholders had relied upon protection of such value. They contended, further, that there should be no allowance for depreciation as the sinking fund is adequate to care for it.

Year's Balance in Detroit Increases

The railway operating revenue of the city of Detroit Department of Street Railways, Detroit, Mich., for the year ended Sept. 30, 1926, was $23,064,009, against $21,736,795 for the year ended Sept. 30, 1925. The coach operating revenue for these two periods was $1,742,686 and $498,384 respectively. Railway operating expenses was $17,406,793, against $15,832,833 for the 1925 period. Coach operating expenses were $1,720,988 for this year, against $486,624 for 1925. The net revenue from all sources was $5,935,286 for the year ended Sept. 30, 1926, and $6,088,089 for the similar period in 1925.

After the consideration of deductions the net income was $3,249,252 for this year, against $3,462,897 last year. The balance for this year's period was $634,328 and for last year $531,285.

The total number of railway passengers for the year ended Sept. 30, 1926, was 495,946,976, against 465,694,211 passengers for the year ended Sept. 30, 1925. The total number of coach passengers was 22,569,423, against 6,811,112 in 1925. The report showed railway revenue car-miles to be 54,870,968, against 50,482,115 in 1925, and the coach revenue miles 7,503,988, against 2,056,587 in 1925.

Traffic on Decline in St. Louis

The United Railways, St. Louis, Mo., during the quarter ended Sept. 30 carried about 5,500 fewer passengers daily than in a similar period last year, according to a report filed with the City Register by Receiver Rolla Wells. It is revealed that during the quarter the company carried 61,989,925 cash passengers, compared with 62,097,861 for the similar month in 1925. In the quarter for which the report has just been filed the company operated on weekdays, except Saturdays, 1,308 cars, on Saturdays 1,104 cars and on Sundays 638. Last year 1.301 cars were used on weekdays, 1,091 cars on Saturdays and 612 cars on Sundays.

The reduction in traffic probably would have been much more pronounced but for the Greater St. Louis Exposition held in Forest Park during the last quarter and the little world's series baseball games between the St. Louis Cardinals and the Pittsburgh Pirates at Sportsman's Park late in August.

For the quarter ended June 30, 1926, the company reported 64,923,573 passengers, against 68,261,621 in a similar quarter of 1925.

Canadian Roads Doing Well

Canadian electric railways are showing an increase in business which is not only substantial but must be regarded as distinctly satisfactory by holders of their securities. For each of the seven months ended July, the increases in number of revenue passengers carried was from 2.46 per cent to 6.36 per cent higher than for the corresponding months of 1925. What is more, the improvement of the Canadian systems in 1926 followed a small improvement throughout the whole of 1925, shown at 0.19 per cent.

For the month of July the increase in revenue passengers carried by the seven Canadian systems reporting was 5.66 per cent. The improvement for July is regarded as very satisfactory, since there was a slight decrease for July, 1925.

Deficits on York Radials Paid

The radial question in Toronto, Ont., took a new turn on Oct. 19, when the City Council adopted unanimously the Board of Control's report recommending that payment be made to the Hydro-Electric Power Commission of Ontario for the accumulated deficits on hydro operation of the York radials up to July 31 of this year. The amount involved is $747,457, made up as deficits of $700,693 for 1923, 1924, 1925 and 1926 and $46,864 of accrued interest.

Conspectus of Indexes for October, 1926

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ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	Oct. 1926 **7.40**	Sept. 1926 **7.36**	Oct. 1925 **7.31**	Oct. 1926 **7.40**	May 1923 [illegible]
Electric Railway Materials* 1913 = 100	Oct. 1926 **155.4**	Sept. 1926 **154.2**	Oct. 1925 **150.9**	Sept. 1920 **247.5**	Oct. 1924 **148.5**
Electric Railway Wages* 1913 = 100	Oct. 1926 **226.2**	Sept. 1926 **226.1**	Oct. 1925 **222.8**	Sept. 1920 **232**	Mar. 1923 [illegible]
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Oct. 1926 **202.9**	Sept. 1926 **203.2**	Oct. 1925 **202.7**	July 1920 **256.4**	May 1922 **167.4**
Eng. News-Record Construction Cost (General) 1913 = 100	Oct. 1926 **209.8**	Sept. 1926 **208.3**	Oct. 1925 **205.4**	June 1920 **273.8**	Mar. 1922 **162.0**
U. S. Bur. Lab. Stat Wholesale Commodities 1913 = 100	Sept. 1926 **150.2**	Aug. 1926 **149.2**	Sept. 1925 **159.7**	May 1920 **246.7**	Jan. 1922 **138.3**
Bradstreet Wholesale Commodities 1913 = 9.21	Oct. 1 1926 **12.79**	Sept. 1 1926 **12.70**	Oct. 1 1925 **14.15**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Sept. 1926 **158.5**	Aug. 1926 **155.7**	Sept. 1925 **159.0**	July 1920 **219.2**	Mar. 1922 **138.7**
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Sept. 1926 **166.8**	Aug. 1926 **165.3**	Sept. 1925 **168.2**	July 1920 **204.5**	Aug. 1922 **154.5**
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Sept. 30 1926 **3.594**	Aug. 31 1926 **3.542**	Sept. 30 1925 **3.717**	July 31 1920 **11.118**	July 31 1924 **3.187**
Bank Clearings Outside N. Y. City (Billions)	Sept. 1926 **17.97**	Aug. 1926 **17.47**	Sept. 1925 **18.19**	Oct. 1925 **20.47**	Feb. 1922 **10.65**
Business Failures Number Liabilities (Millions)	Sept. 1926 **1360** **34.38**	Aug. 1926 **1516** **33.77**	Sept. 1925 **1234** **27.89**	Jan. 1924 **2231** **122.95**	Aug. 1925 **1353** **27.22**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

The action of the Council followed a conference between the Board of Control and C. A. Magrath, chairman of the Hydro-Electric Power Commission, at which Mr. Magrath insisted that these funds were needed at once by the commission to avoid financial embarrassment. Funds needed to cover the further deficit incurred between July 31 and Oct. 31 this year were not reported. In a letter to the Board of Control, recently made public, the Toronto Transportation Commission advised that the radials be abandoned because of their unprofitable return.

The poor showing of the radials and the subsequent hectic meetings on the disposition of these lines have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

4,184,841 More Surface Line Riders in Chicago in Month

The monthly report of the Chicago Surface Lines for September points to an increase of 4,184,841 revenue rides over the number carried in the similar month last year. The total rides for the month were 127,149,619, of which 70,279,811 were revenue passengers, 52,926,708 transfer passengers and 3,943,100 free passengers. The average fare per ride was 3.82 cents.

During the first nine months of 1926 the Chicago Surface Lines has shown a consistent gain in traffic compared with the corresponding period of 1925. The addition of 100 new cars during September and October fortifies the company in its plans to care for the big increase in traffic expected during the Christmas shopping season.

EARNINGS OF CHICAGO SURFACE LINES

September	1926	1925
Gross earnings	$4,916,535	$4,721,820
Operating expenses, taxes, etc.	3,889,973	3,753,402
Joint expense account	34,525	10,000
5 per cent interest on purchase price	671,493	671,965
Divisible receipts	320,543	286,453
City's share	176,299	157,549
Company share	144,244	128,904

Divisible receipts for September were $320,543, after taxes, renewals, operating expenses and the 5 per cent interest on the purchase price, against $221,855 in August and $286,453 in September of last year.

Segregation of Delaware & Hudson Properties Authorized

The managers of the Delaware & Hudson Company were authorized by the stockholders at a special meeting on Oct. 26 "to transfer to a corporation or corporations (all the stock of which shall be owned by the Delaware & Hudson Company) all or any of the railroad properties, boat lines, traction lines, motor bus lines, hotels and other analogous interests belonging to it. . . ."

L. F. Loree, president of the road, explained that no plan had matured to date for the segregation of the D. & H. coal properties, since the stockholders granted the board authority to sell the holdings at a meeting in May, 1925.

Commission Hears Chicago Rapid Transit Security Petition

Evidence bearing on the petition of the Chicago Rapid Transit Company for permission to issue and sell $1,500,000 of 7.2 per cent prior preferred stock, series B, and on another, seeking authority to issue $1,795,000 of first and refunding mortgage gold bonds, series A, was heard in Chicago on Oct. 26 by the Illinois Commerce Commission. Orders on both petitions will probably be issued within the next ten days.

The preferred stock is to be sold to reimburse the company for improvements already made this year.

As mentioned in the ELECTRIC RAILWAY JOURNAL for Oct. 16, a special meeting of the stockholders of the company is to be held on Dec. 9 to vote an increase in the company's capital stock from $25,330,500 to $30,330,500, to be issued in the form of prior preferred stock to provide for future capital requirements.

Receiver Appointed for Geneva Road

The Geneva, Seneca Falls & Auburn Railroad, Waterloo, N. Y., went into the hands of Lansing S. Hoskins and James M. Ryan, as receivers, on Oct. 20. The road was forced into bankruptcy by the Chatham & Phoenix National Bank & Trust Company, New York, representing the holders of $504,000 of bonds on which the company was unable to pay interest due on Jan. 1, 1926. Operation will be maintained on the electric line and the Geneva Railway & Bus Line, a subsidiary.

The company operates about 14 miles of line. It was incorporated in 1913 as the successor to the Geneva & Auburn Railway, which had been sold under foreclosure.

Indianapolis & Cincinnati Reorganization Progress

Current newspaper accounts to the contrary notwithstanding, nothing definite has been done or even agreed upon regarding the proposed reorganization of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind. Nor will anything definite be done along these lines until a decree is entered in the pending foreclosure suit, intended to clear up all debatable questions regarding the property to the end that those interested may know exactly how the matter stands in every respect. It is not possible to tell how soon this will be done, but it will probably be in the near future.

Changes in Financial Set Up Approved in New Jersey

At a special meeting of the stockholders of Public Service Corporation of New Jersey held on Oct. 19 the certificate of incorporation was by a vote of more than two-thirds of all classes of stock outstanding amended in accordance with the recommendation of the board of directors so as to:

1. Increase the authorized preferred stock from 1,000,000 to 2,000,000 shares.
2. Increase the common stock from 2,000,000 to 10,000,000 shares.
3. Provide that of the 2,000,000 shares of preferred stock, 1,250,000 shall be 6 per cent cumulative preferred.
4. Provide for the payment of monthly instead of quarterly dividends on 6 per cent preferred stock.
5. Provide for an exchange of the common stock outstanding at the time the amendment takes effect on the basis of one share of present stock for three shares of the common stock authorized by the amendment.

To the stockholders present at the meeting President McCarter said:

> The corporation is having its best year. Its affairs were never in better condition than they are now nor have its prospects for the future ever been brighter. I have been in this work sufficiently long not to have any delusions about it, so I speak with some confidence when I say that the corporation's condition is very prosperous. We look forward to a continuance of this prosperity in the future, which, of course, will redound to the benefit of the stockholders.

Net Income Lower.—For the three months period ended Sept. 30, 1926, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was $2,754,902, against $2,760,996 for the similar period last year. Operating expenses and taxes increased from $2,368,555 to $2,409,750 for the three months period ended Sept. 30, 1926. After consideration of income deductions there was a net corporate income for the period from July through September of this year of $268,009, against $321,473 for the similar 1925 period.

Net of Eastern Massachusetts for Nine Months Up.—The Eastern Massachusetts Street Railway, Boston, Mass., reports net income of $20,824 for September after charges, depreciation and taxes against $50,904 in September, 1925. Nine months net income was $550,892 after above charges against $543,318 in the similar period of 1925.

Charitable Disbursements Large in Louisville.—The balance in the fund of the co-operative association of the Louisville Railway, Louisville, Ky., on Aug. 1, 1926, was $4,366, and interest on deposits $4.60. The disbursements, including sick benefits, death benefits, salaries and recreation, totaled $1,822. The balance as of Aug. 31, 1926, therefore, was $2,549.

Net Income Increases.—For the nine months period ended September, 1926, the gross revenues of the Twin City Rapid Transit Company and subsidiaries, Minneapolis, Minn., were $9,479,051, against $9,231,793 in 1925. Operating expenses increased from $6,853,485 in 1925 to $6,913,957 in the 1926 period. Net income also advanced from $714,611 in 1925 to $901,085 for the nine months period ended September, 1926.

Nine Months Net Off in Boston.—The Boston Elevated Railway, Boston, Mass., reports to the Department of Public Utilities for the quarter ended Sept. 30, 1926, gross revenue of $7,836,886, compared with $7,686,541 in the third quarter of 1925, and deficit after cost of service and dividends of $1,081,119, against $793,836. Gross revenue for the first nine months of 1926 was $25,957,201, comparing with $25,267,219 in the first nine months of 1925, and deficit after above charges of $749,654, as contrasted with surplus of $49,877 in the similar period of the previous year.

Personal Items

Another Employee Director Elected

W. E. Murphy, Chief Dispatcher, Made Representative of Employees on International Board

William E. Murphy, chief dispatcher for the International Railway, Buffalo, N. Y., was elected a member of the board of directors on Oct. 25. He is the second employee to be made a director, the other representative of the workers being George Burgain, motorman at Cold Spring station. By this action the employees will have double representation in discussions of the affairs of the railway.

Mr. Murphy is vice-president of the I. R. C. Co-operative Association, of which Mr. Burgain is president. Members of this association, comprising the employees of the company, collectively hold $2,000,000, par value, of the company's bonds and stocks, have a saving fund of about $100,000, and each member is protected by a $1,000 life insurance policy. Under the Mitten co-operative plan the men have 50-50 jurisdiction with management in all discussions of wages, working conditions, discipline, etc.

W. E. Murphy

The new director has been employed by the railway continuously for 26 years. His first position, as clerk in the engineers' office, paid $35 a month. Shortly afterward he became timekeeper in the track department, from which position he went to the switchboard. In 1904 he was made a dispatcher, controlling the movement of cars, dispatching of the emergency wagons and attending to similar operating problems. In 1921 he was promoted to the position of chief dispatcher. His office is the nerve center of the entire system on the Niagara frontier, stretching from Buffalo to Niagara Falls, to Chippewa and Queenstown on the Canadian side, and through Lockport to Olcott Beach, which is on Lake Ontario.

Mr. Murphy is the third employee to be elected to the position of director of the company. In 1925 James E. Deaton, full-blooded Mohawk Indian, a pitman in the shops of the company at Niagara Falls, Ont., and then president of the I. R. C. Co-operative Association, was thus honored. He was succeeded by George E. Burgain when the latter became president of the association, and Mr. Burgain is now joined by his vice-president. Together they will represent the employees in the most intimate discussions of company policy and progress.

Personnel Changes in Fitchburg

Emerson W. Baker, district attorney, has been elected president of the reorganized Fitchburg & Leominster Street Railway, Fitchburg, Mass. In this capacity he succeeds Wesley W. Sargent, resigned.

George R. Wallace, Jr., was elected vice-president to fill the vacancy caused by the resignation of Herbert I. Wallace.

Louis H. Cushing is general manager.

Edwin G. Ordway is serving as superintendent of traffic. He has been adjuster of claims of the company for many years.

B. J. Wahle Shore Line Coach Official

Bernard J. Wahle, for the last year and a half assistant general manager and assistant secretary and treasurer of the Calumet Motor Coach Company, Hammond, Ind., has been appointed assistant treasurer and auditor of the Shore Line Motor Coach Company, Gary, Ind.

Since he was graduated from Crane Technical College in Chicago in 1912, Mr. Wahle has been connected with various banking and industrial concerns in the capacity of accountant. He was with the Continental & Commercial National Bank, Chicago, for five years prior to the war, during which he served as paymaster and financial representative of the U. S. Navy at Newport, R. I., and Baltimore, Md.

In 1919 he resigned from the Navy to become associated with a firm of public accountants in Chicago. Later, he went to work for the Industrial Appliance Company of that city as auditor.

As operating engineer for the Yellow Cab Company in Chicago, he was subsequently for four years engaged in assisting insolvent taxicab companies to reorganize. In 1925 he entered the employ of the Calumet Motor Coach Company, an independent bus line in Hammond, Ind., but became connected with the Shore Line Motor Coach Company when the Calumet company was brought under unified management last August.

The Shore Line Motor Coach Company is jointly controlled through stock ownership by the Chicago, South Shore & South Bend Railroad and the Gary Railways, members of the Midland group of Insull utility companies.

T. W. Noonan General Manager of Pittsburgh Bus Operation

T. W. Noonan has recently been appointed general manager of the Pittsburgh Motor Coach Company, a subsidiary of the Pittsburgh Railways, Pittsburgh, Pa. He became affiliated with railway work in 1907 when he entered the employ of the Pittsburgh Railways. He served successively as payroll clerk, in the traffic department, in the general manager's office, in the overhead lines department, as secretary to the president of the Duquesne Light Company, and the Pittsburgh Railways. In 1917 he joined the U. S. Army and went overseas. He was discharged from military service in 1919. He re-entered the employ of the Philadelphia Company and affiliated companies in June, 1919, as chief clerk to the operating assistant to the president. His connection with the Pittsburgh Motor Coach Company dates from Dec. 1, 1925, when he assumed the duties of service manager. It is of this company that he was appointed general manager some few weeks ago. The Pittsburgh Motor Coach Company operates 33 miles over territory in and surrounding Pittsburgh.

T. W. Noonan

Mr. Noonan was born in 1888 in Pittsburgh. He attended the grade and high schools there and was graduated from the Duquesne University.

Bill Boyce on Pittsburgh Conference Board

W. H. Boyce, commercial manager of the Pittsburgh Railways, Pittsburgh, Pa., has succeeded Frank R. Phillips as the railway company's representative on the Traction Conference Board. Pittsburgh is represented on the board by two members and the boroughs and townships by a fourth member. As noted previously in the ELECTRIC RAILWAY JOURNAL Mr. Phillips has been appointed to the Duquesne Light Company.

Changes in Westinghouse Engineering Department

R. E. Hellmund Is Made Chief Electrical Engineer and A. M. Dudley is Made Engineering Supervisor

R. E. Hellmund, formerly engineering supervisor of development for the Westinghouse Electric & Manufacturing Company, has been appointed to the newly created office of chief electrical engineer and A. M. Dudley, formerly manager automotive equipment engineering department, has been made engineering supervisor of development, the position left vacant by Mr. Hellmund's promotion.

Mr. Hellmund's activities in his new position will be principally in connection with electrical development work to assure the adequacy and progressiveness of designs and properly to co-ordinate this work throughout the engineering department. He will continue to serve as chairman of the engineering educational committee and will also retain his connection with the supervisory group on development and the patent board.

Mr. Hellmund entered the employ of the Westinghouse company in 1907 as a designer of induction motors. Later he was engaged in general engineering work and, in 1912, was placed in charge of the design of all direct-current and alternating-current railway motors. In 1917 he engaged in miscellaneous consulting work for the company. In this capacity he continued until 1921, when he was appointed engineering supervisor of development. He continued in this capacity until his recent promotion.

He was born in Gotha, Germany, on Feb. 2, 1879, and was graduated from the College of Illmenau in 1898 with the degree of electrical engineer.

Mr. Dudley entered the service of the Westinghouse company as an apprentice in 1904. Shortly afterward he was given a position in the company's engineering department, where he was engaged in the design of alternating-current motors and controllers. Early in 1906 he was made commercial and general engineer in the industrial and power sales department.

In 1907 he was placed in charge of the alternating current motor section and continued in this position until 1918, when he was placed in charge of the design of starting, lighting, and ignition equipment for automobiles. In 1920 he was made manager of the automotive equipment, engineering department. This position he held until 1924, when he was appointed to assist Mr. Hellmund in his work as engineering supervisor of development.

In the capacity of engineering supervisor of development Mr. Dudley will be responsible for all central activities of the engineering department in connection with the development budget and program of the electrical group. He will continue to act as secretary of the engineering educational committee and secretary of the supervisory group on development.

Mr. Dudley has taken out numerous patents on the details of construction of electric machinery. He was born in Cincinnati, Ohio, in 1877, and was graduated from the University of Michigan in 1902 with a degree of bachelor of science in electrical engineering.

Messrs. Egolf and Savage Advanced by North Shore

John F. Egolf, former general manager of the Aurora, Elgin & Fox River Electric Company and for the past few months assistant to the president of the Chicago, North Shore & Milwaukee, Chicago, Aurora & Elgin and Chicago, South Shore & South Bend Railroads, was appointed general manager of the Chicago, North Shore & Milwaukee Railroad on Oct. 26. He succeeds Jesse S. Hyatt, who was recently made engineering assistant to Bernard J. Fallon, vice-president of the North Shore, South Shore, Aurora & Elgin and Chicago Rapid Transit Lines.

Mr. Egolf began his railroad career as a conductor on the Columbus, Ohio, street railways in 1902 and from that position rose to assistant superintendent of the Ohio Electric Railway. Later he became general manager of the Springfield & Xenia Railway. He was president of the Illinois Electric Railway Association in 1925.

Simultaneous with Mr. Egolf's appointment, Howard P. Savage, newly elected commander of the American Legion and former superintendent of the maintenance of way division of the Chicago Rapid Transit Company, was named assistant general manager of the North Shore Line. Mr. Savage entered the service of the rapid transit company as track foreman in 1913. In his new position he succeeds Bert W. Arnold, who will continue as manager of the motor coach department of the company and will also assist B. J. Fallon, vice-president in charge of operation.

Harry B. Ivers Joins Parker Staff

Harry B. Ivers, widely known among electric railway executives of New England for his service on the former Old Colony Street Railway and on various Maine properties, has been appointed head of the newly created co-ordinating department of C. D. Parker & Company, Boston, Mass., investment bankers. He will report to Vice-President Bowen Tufts.

In 1893 Mr. Ivers entered the electric railway field on the Norfolk Suburban Street Railway and during nine years of service on that property and the Old Colony Street Railway rose to the post of assistant treasurer of the latter. For four years he was treasurer and manager of the railway, lighting and gas utilities at Westerly, R. I., and then went to the Milford Electric Light Company of New Hampshire, where he was occupied in hydro-electric development. He next became treasurer and assistant to the president of the Bangor Railway & Electric Company, Bangor, Me., and for eight years served as general manager of the Lewiston, Augusta & Waterville Street Railway. He was the first general manager of the Cumberland County Power & Light Company, Portland, Me., during this period. Since 1917 Mr. Ivers has been engaged in various activities, including a term of service in the banking business.

H. C. Couch Honored Again

President of New Arkansas Organization One of the South's Most Useful and Prominent Citizens

When the record of utility achievement in the South has been written, one of the most conspicuous names on the roster of useful citizens will be H. C. Couch, prosperity promoter of Mississippi and Arkansas. His dauntless pioneering and untiring energies in behalf of these two states have won public approval and recognition from time to time within the past four years. An added distinction has been conferred upon him in his recent election as president of the new utility group, the Arkansas Power & Light Company, formed by the Electric Bond & Share Company, New York, N. Y. This merger brings under one corporate head public utility properties in Arkansas and honors, because of his executive and financial ability, one who perhaps knows more about Arkansas and its possibilities than any other man.

As president of the new Arkansas Power & Light Company Mr. Couch also serves as president of the Pine Bluff Company, operating 10 miles of electric railway in Pine Bluff, Ark. Assisting Mr. Couch in his work will be two vice-presidents, namely, C. J. Griffith, vice-president and general manager of the Arkansas Central Power Company, and J. L. Longino, vice-president and general manager of the Arkansas Light & Power Company. Other officers will be former officials of the Arkansas Light & Power Company, the Arkansas Central Power Company and the Pine Bluff Company.

Harvey Couch is not so much interested in the recognition and subsequent honors as he is in having gratified, to some extent, his ambition to play a part in the great utility development of the South. His goal was rather to make his particular section a better place in which to live, and in this he has succeeded. Railway patrons, manufacturers and farmers, the latter especially, are unanimous in the belief that if a young mail clerk, a son of Georgia parents, had not turned his attention twenty years ago to utility enterprises the new South would still be a dream.

Born in Magnolia, Ark., 49 years ago, Mr. Couch worked in his early youth as a mail clerk running between Memphis and Texarkana. While at this job he determined to make the life of farmers an easier and better one by building more telephone lines. He paid another clerk $100 to swap runs and he took the run from McNeil, Ark., to Bienville, La. In partnership with the postmaster at Bienville he sold coupons for telephone service to the farmers, and with this money and their reputation obtained credit for wire and insulators and built a telephone line, using small trees for poles. His subsequent selling coup, by which the Southwestern Bell Telephone Company parted with $1,500,000 in favor of the Couch-Longino combination, is a thrilling chapter in the romance of the South.

Mr. Couch next turned his attention and energies to the electric light and power possibilities in Arkansas, acquiring the systems of Arkadelphia and Malvern. As president of the Arkansas Light & Power Company and the Pine Bluff Company his outstanding services have been mentioned previously in these columns. The railway line he reconstructed until it was put on a paying basis. He saw the same opportunities for service in Mississippi that had stimulated him in Arkansas. He and his associates acquired public service properties in Jackson, Columbus, Greenville and Vicksburg. The Mississippi Power & Light Company was organized, with C. P. Couch, brother of H. C. Couch, as vice-president and general manager at Jackson.

True it is that many railway and power magnates made valuable contributions to utility progress, but it is to be remembered that Mr. Couch succeeded in the midst of war-time struggle and industrial stress. With him success was within—no chameleon judgment, but an adamant purpose to win for others and himself some of the amenities of life to be lived in Arkansas and vicinity. In the midst of sterner realities he remained visionary, an idealist, with performance always part of the dream.

The Pine Bluff Chamber of Commerce good citizenship award of 1925 was presented to him early this year. This trophy was voted to him by the unanimous opinion of a committee representing, in the words of the Pine Bluff *Commercial*, "every activity, every walk of life and every phase of community life in Pine Bluff." A few years ago the Mystic Shriners elected him a potentate. By that title he will always be known in the utility field.

A. W. Brownsworth has succeeded Fred Heckler as master mechanic of the Lake Shore Electric Railway with office at Sandusky, Ohio.

Thomas A. Wright, Jr., has resigned as purchasing agent of the Wilkes-Barre Railway, Wilkes-Barre, Pa. He has been connected with the company in many different capacities for the past thirteen years.

Obituary

Frederick M. Nellis, special representative at New York of the Westinghouse Air Brake Company and secretary since 1899 of the Air Brake Association, died on Oct. 16. He entered the service of the Westinghouse Air Brake Company in 1882 as a demonstrator on its instruction car. Later he went to Cornell University and took a special course in mechanical engineering, remaining at Cornell for three years and being graduated with the class of 1899. He then resumed his association with the Westinghouse Air Brake Company, serving in various responsible positions. For a number of years he was on the editorial staff of *Locomotive Engineering*. Mr. Nellis was born in 1862 at Tionesta, Pa. Early in his career he was a locomotive engineman on the Panhandle Division of the Pennsylvania Railroad. Throughout the remainder of his life he was a member of the Brotherhood of Locomotive Engineers.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Brill Will Build Philadelphia's 150 New Subway Cars

A contract for building 150 high-speed electric cars for Philadelphia's new Broad Street subway was awarded to the J. G. Brill Company on Oct. 26 by Henry E. Ehlers, Director of City Transit for the city of Philadelphia.

The Brill bid, which was the lowest of several received some weeks ago, was $4,039,434, and in awarding the contract Director Ehlers placed the limit at $4,500,000 to take care of unforeseen expenditures. Under the specifications delivery must begin in May of next year and continue until the full consignment has been delivered to the Fern Rock terminal yard.

The cars will be built at the Brill plant in Philadelphia. The Department of City Transit is to supply the motors, motor control equipment, air brake equipment, door-operating devices, couplers and draft gears and other appliances. Bids for this equipment will be advertised for shortly.

Under the Brill contract ten extra trucks are to be delivered. It is also planned to equip ten of the 150 cars with Hyatt roller bearings to determine the effectiveness of roller bearings in this type of equipment.

To Stimulate Interest in Good Roads

A desire to stimulate interest in the good roads movement has actuated the Kelly-Springfield Tire Company to send out a "Good Roads Special" on a tour of the United States. The car, from the front, has the appearance of a locomotive, and from the rear, of an observation car. It was first introduced at the convention of the American Electric Railway Association in Cleveland during the week of Oct. 4. The realism of the special is heightened by the fact that it has a smokestack which emits smoke, a real bell and whistle, a sandbox, and Westinghouse air brakes.

Training Apprentices for Industry

A thoroughgoing treatise on the subject of apprenticeship in industry has been issued by the department of manufacture of the Chamber of Commerce of the United States. Information and experiences in the development of industrial training are very completely reported in this booklet, and as a result of the investigation which has been made in preparing the report a number of deductions are made which will be of real interest to all executives charged with the supervision of mechanics and shop labor. Special emphasis is laid upon the value of co-operating with manufacturers and industrial organizations in the training of apprentices by city school systems. It was found as a result of a survey conducted on this point that a large majority of vocational education is carried on in direct conjunction with the industrial organizations of the communities involved, and that the courses described are laid out with a view to training young men for specific lines of employment.

While training of employees for railway shop practice is not specially considered, the subject of industrial apprenticeship has been treated in a sufficiently broad manner to make it well worthy of the attention of railway executives and of railway equipment manufacturers. Apprenticeship for both large and small companies is considered, and the experiences of a number of typical companies are considered in outlining the results of the survey. Opinions of representatives of employers, labor and the engineering profession on the subject of apprenticeship are included.

Every Section of the Country Will Be Visited by This Unusual Herald of the Good Roads Movement

Frank Fageol Resigns

Frank R. Fageol has just announced his resignation from the American Car & Foundry Motors Corporation, New York, N. Y. Mr. Fageol was formerly head of the Fageol Motors Corporation of Oakland, Cal., and the Fageol Company of Kent, Ohio. These two companies were consolidated with the American Car & Foundry Company some time ago and the American Car & Foundry Motors Corporation was founded.

Mr. Fageol has not announced any definite plans for the future, aside from the fact that he intends to take a much-needed vacation in the next few months. It is understood that he will retain no affiliation with the American Car & Foundry Motors Corporation or with the subsidiary Fageol companies. He is now in California and expects to remain on the coast for several weeks.

Rail Orders Are Not Fluctuating

Orders for steel rails thus far placed in the last third of the current year for delivery in 1927 total about 550,000 tons, it is reported. The total last year, September to December inclusive, reached approximately 1,500,000 tons, and it is estimated that the current year's buying will be about the same. No material extensions of existing rail lines are indicated in the purchases for 1926, the total tonnage being almost entirely for replacement use.

J. G. Brill Dividend Period Coincides with Calendar Year

A dividend of $2.91⅔ a share has been declared by the J. G. Brill Company, Philadelphia, Pa. This is at the rate of $5 per share per annum on outstanding common stock for the period from March 1, 1926, to Oct. 1, 1926, to adjust the dividend period to coincide with the calendar year. On March 1 a quarterly dividend of $1.25 a share was paid on the common stock, which was the rate paid quarterly during 1925. The regular quarterly dividend of 1¾ per cent was also declared on the preferred stock. Both of the above dividends are payable Nov. 1 to holders of record Oct. 29.

A Significant Demonstration of Electrical Transportation

On Oct. 29 the directors and officials of the General Electric Company participated in a unique demonstration of various types of electrical transportation mediums. Gathering at the Grand Central Station in New York City at 10 o'clock Friday morning, the General Electric representatives, officials of the New York, New Haven & Hartford Railroad, and various newspaper and technical journal representatives boarded a special two-car train which was pulled to New Rochelle by one of the New Haven standard electric locomotives.

At New Rochelle this locomotive was detached from the train and an oil-electric locomotive took its place. Again, at Stamford, the oil-electric locomotive was dropped off and one of the General Electric Company's a.c.-d.c. locomotives took up the load. When South Norwalk, Conn., was reached the party detrained and boarded a gas-electric rail car which was waiting for them at that point. Thence they proceeded to Bridgeport, Conn., where the party was picked up by gas-electric buses and taken to the General Electric plant located there. The officials and guests were thus enabled to compare the different types of electrical transportation equipment in regular railway service, as the various stops and changes of motive power were made, and it was possible to draw important conclusions as to the relative merits of each form of equipment for main and branch-line service.

Upon reaching Bridgeport the board of directors and other officials of the General Electric Company went directly to the company's plant which is located there. Newspaper representatives and technical journalists were taken to the University Club for lunch, while the General Electric board went into session for a short meeting. Later the directors were served with luncheon at the plant, where they were joined by a number of prominent local business men, Governor Trumbull of Connecticut, the Mayor of Bridgeport and others. Following the luncheons those who so desired were conducted through the General Electric plant, while the others returned by regular trains to New York or other points.

Experimental Gas-Electric Snowplow in Use in Philadelphia Last Winter

All save four of the members of the General Electric board of directors were present at the meeting in Bridgeport. In addition, F. C. Pratt, G. P. Baldwin, J. G. Barry, E. W. Allen, W. B. Potter and H. L. Andrews, the two latter executives of the railway department, were on hand. E. J. Pearson, president of the New Haven Railroad, and two directors of that road, J. H. Harding and W. B. Lashar, were in the party that went up from New York.

Westinghouse Billings Continue to Rise

For the quarter ended Sept. 30, 1926, orders amounting to $41,008,310 were reported by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., as compared with $41,250,000 in the corresponding quarter a year ago. The sales billed showed an increase this year, totaling $49,313,230, as against $46,700,000 in the similar quarter last year. For the six months ended Sept. 30 orders amounted to $85,870,667, compared with $85,682,211 in the similar period during 1925, and sales billed $94,453,186, as against $85,424,000.

To Join the Yellow Truck & Coach Manufacturing Company

Raymond C. Snell, formerly in the electric and steam railroad division of the national sales department of the White Company, Cleveland, has joined the Yellow Manufacturing sales organization as assistant to H. E. Listman, vice-president. Mr. Snell has been with the White Company for three years. Prior to this time he was connected with the electric railway industry. Mr. Snell, as assistant to Mr. Listman, will act as special representative of the Yellow Truck & Coach Manufacturing Company. His headquarters will be in Chicago.

Gas-Electric Drive for Snowplows

Fifteen snowplows equipped with gas-electric drive are being obtained by the Philadelphia Rural Transit Company, bus operating subsidiary of the Philadelphia Rapid Transit Company, for use this winter in keeping the roads open for its large fleet of buses, which also have gas-electric drive. The plows were adopted after an experimental unit was tried by the company last winter.

Incorporation of gas-electric drive in this service marks the first use of such transmission for other than buses. The plows are mounted on the fronts of trucks and are being manufactured by the Walters Motor Truck Company of Long Island. The electrical equipment, similar to that in the hundreds of buses used by the railway, is being supplied by the General Electric Company. The snow fronts are demountable, so that the trucks will be of service during the summer.

The plows are furnished with two-motor equipment, thus eliminating the differential and reducing wheel slippage and skidding. Some of the inherent characteristics of gas-electric drive found advantageous in bus operation, such as higher schedule speeds and greater comfort for passengers, are not of so much importance in a consideration of plow equipment, but other advantages, such as the impossibility of racing under load or stalling the engine, are important.

Track and Line

Utah Light & Traction Company, Salt Lake City, Utah, has been granted permission by the county commission to provide a single-track turnout or Y track at the intersection of 33d Street South and Highland Drive running eastward.

New York, N. Y.—The Board of Transportation on Sept. 14 asked for bids, receivable Oct. 8, for the construction of the elevated portion of the Fourteenth Street-Eastern subway from Stewart Street, connecting with the Broadway elevated structure, Brooklyn, to East New York. This is the only remaining section of the Fourteenth Street-Eastern line not under construction.

Wisconsin Gas & Electric Company, Kenosha, Wis., has started the work of replacing the single track in Racine on its West Sixth Street line with double track from Lafayette Avenue west to the Kinzie Avenue bridge. Consideration is being given to the plan of extending the West Sixth Street line on Linderman Avenue over the North Shore tracks into West Racine, thence to the Manree Park addition.

Pacific Electric Railway, Los Angeles, Cal., started service recently over the 9,700-ft. extension to the Reliance Rock Company's plant near Azusa. The new line, which branches off the Covina line near Bassett, using an electrified section of the Southern Pacific Company tracks for a distance of 4,500 ft., extends in a northeasterly direction from Bassett. Construction work on the project, costing approximately $200,000, was begun on April 17, and but 3½ months was required to bring it into operating condition. Seventy-five-pound rail was used and catenary type of construction employed in the overhead. An interchange yard of six tracks, capable of storing 125 cars, was constructed. Storage yards adjacent to the rock company's plant also will care for the storage and handling of approximately 100 cars. At the present time the Reliance Rock Company is the only industry served by the new extension, this company's product being crushed rock, sand and gravel, used largely in highway construction in this section.

Power Houses, Shops and Buildings

Los Angeles Railway, Los Angeles, Cal., has given a contract to the Willard Brent Company for the erection of a modern brick, reinforced concrete and steel structure to be used for general bus, truck and auto inspection and as a repair shop. The building will be 310 ft. long and 100 ft. wide. It will provide pit accommodations for 30 buses. It will also contain store room, machine shop, battery room and offices for the superintendent of automotive equipment. The machine shop will be equipped with lathes, milling machines and cylinder grinders. Plans call for three traveling cranes to run the entire length of the building. All of the plans for the new structure were drawn by the engineering department of the railway.

Nashville Railway & Light Company, Nashville, Tenn., has been granted the permit for the construction of a $20,000 fireproof one-story garage. The building will be located on Fourth Avenue, North, adjoining the carpenter shop of the company's car shops, and will be used as a temporary storage garage for the company's motor vehicles, including the new buses which are reported soon to be put in operation.

Trade Notes

Silent Hoist Winch & Crane Company, Brooklyn, N. Y., announces the removal of its works and general offices into its new building at 762 to 772 Henry Street, Brooklyn. The company manufactures winches, cranes and derricks for motor trucks, and electric and gasoline car pullers, hoists and winches, as well as equipment to meet unusual requirements in hoisting work.

Sullivan Machinery Company, Chicago, Ill., announces the appointment of J. E. M. Schultz as manager of its office in Dallas, Tex., to take the place of D. H. Hunter, who has resigned.

G. C. Barry has been appointed assistant to E. G. Hines, general sales manager of American Brown Boveri Electric Corporation, New York, N. Y.

National Carbon Company, Inc., Cleveland, Ohio, has prepared a moving picture entitled "Behind the Pyramids," which shows in a very interesting manner the manufacture, application, operation and care of carbon brushes and other carbon products used in the electrical industry. This picture will be shown before technical society meetings, operating department groups and engineering college classes. There are three reels of film, requiring approximately 45 minutes for showing. Arrangements for showing this film may be made by writing to the carbon sales division, National Carbon Company, Inc., Cleveland, Ohio, or through its sales engineers.

A. D. McKerrow has been appointed sales representative in central New England for the Line Material Company, South Milwaukee, Wis. Mr. McKerrow's headquarters will be at 10 High Street, Boston, Mass. He was formerly manager of the paper and rubber mill department of the Westinghouse Electric & Manufacturing Company's New England office in Boston and prior to that was employed in the engineering and commercial departments of the New England Power Company, Worcester, Mass.

Indianapolis Street Railway, Indianapolis, Ind., has completed contracts for financing and building five electric substations mentioned in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 18, 1926, page 482, and designed to replace completely the present methods of supplying power to the Indianapolis street car lines. Under the contracts more than $600,000 will be spent immediately, the end being more dependable and faster service. The improved plan of supplying current includes four substations of the automatic and one of the manually operated type. Construction on the new stations will begin immediately. The contract for the electrical equipment provides for shipments by units, covering a period of about four months, and the building program calls for completion of the buildings in time to house the equipment as it is received. The equipment will be provided by the Westinghouse Electric & Manufacturing Company and will consist of transformers and rotary converters.

New Advertising Literature

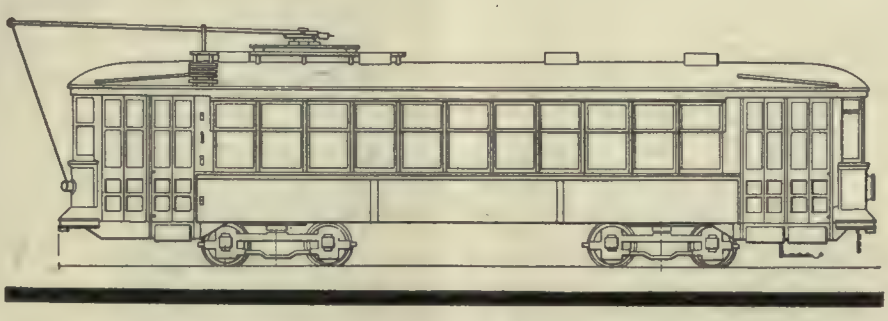
Electric Railway Improvement Company, Cleveland, Ohio, announces the publication of three new catalogs bearing on steel arc-weld rail bonds, portable arc welding and bonding equipment for voltages above 400 and copper arc weld rail bonds. Circular No. 15 outlines a new method of directly copper arc welding rail bonds to mine and railway rail and describes the effect of a new type of copper arc welding rod which carries a special coating. Circular No. 16 is a complete treatise on the various types and methods of arc weld bonding of railway and mine rail and contains a considerable amount of data of value to bonding crews, as well as to purchasing and engineering departments. The Erico type SR portable bonding and arc welding outfit is described in circular No. 17. This circular gives complete data on the use of this equipment for electric welding, brazed bonding and arc welding. In addition to the description of the welding, pictures and explanatory matter are given on a new type of trailer which has just been brought out by the company.

J. G. Brill Company, Philadelphia, Pa., has issued a leaflet giving information on savings in operating costs effected by new cars on four railway properties where modernized rolling stock has been placed in service.

Cornell Iron Works, Inc., Long Island City, N. Y., has issued a new 32-page catalog on steel rolling shutters and doors. The publication describes steel rolling doors and labeled Underwriters' rolling fire doors and includes details of construction with full dimensions and specifications. Fifty actual installations of these doors and shutters in factories, warehouses, shops, etc., are described and illustrated.

Metal, Coal and Material Prices

Metals-New York	Oct. 26, 1926
Copper, electrolytic, cents per lb	13.80
Copper wire, cents per lb	16.00
Lead, cents per lb	8.25
Zinc, cents per lb	7.56
Tin, Straits, cents per lb	69.00
Bituminous Coal, f.o.b. Lines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$7.375
Somerset mine run, Boston, net tons	4.125
Pittsburgh mine run, Pittsburgh, net tons	2.675
Franklin, Ill., screenings, Chicago, net tons	1.525
Central, Ill., screenings, Chicago, net tons	1.45
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, ptr 1,000 ft	$5.75
Weatherproof wire base, N. Y., cents per lb	17.75
Cement, Chicago net prices, without bags	2.10
Linsed oil (5-bbl. lots), N. Y., cents per lb	11.50
White lead in oil (100-lb. keg), N. Y., cents per lb	15.25
Turpentine (bbl. lots), N. Y., per gal	$0.89



Safety Cars that are "Safe"

Recently the Alabama Power Company placed an order for double truck, single end safety cars. They will have a seating capacity of 53 and will weigh 32,000 lbs. each.

In the designing of these cars safety was the major consideration. Included in the specifications is every conceivable safety device to make these real safety cars.

Of course the principal specifications include

Peacock Staffless Brakes

Peacock Staffless have three times the braking capacity of ordinary hand brakes. Their 144-in. chain winding capacity insures adequate braking power even though brake shoes are worn and brake rigging is loose. Their installation and maintenance costs are low. They occupy minimum platform space. There are many other features that adapt Peacock Staffless Brakes to the modern safety cars. Write for facts, figures and estimates.

National Brake Company, Inc.
890 Ellicott Square, Buffalo, N. Y.
Canadian Representative
Lyman Tube & Supply Co., Ltd., Montreal, Can.

One of the Northland Transportation Company's Goodyear-equipped buses; insert of Goodyear Pneumatic Bus Tire

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.

"Eight Years of Wonderful Service"

"We have been constant users of Goodyear Tires during the past eight years," writes Mr. C. E. Wickman, General Manager of the Northland Transportation Company, Minneapolis, Minnesota.

"Our tire performance," Mr. Wickman continues, "has been very satisfactory.

"During the past six months we have removed from service several Goodyear Tires with exceptional mileage, averaging as high as 40,000 miles per tire.

"We are now operating 134 observation- and parlor-car buses. Some make as much as 9000 miles per month with our long rural routes.

"Goodyear Bus Tires have given us wonderful service so far as safety and tire economy are concerned."

* * *

Goodyear Bus Tires give wonderful service wherever they are used—in Minnesota snows, Iowa mud, California mountains, New York and Chicago streets.

They are more durable, more dependable, better cushioning, and they cost less per tire mile.

* * *

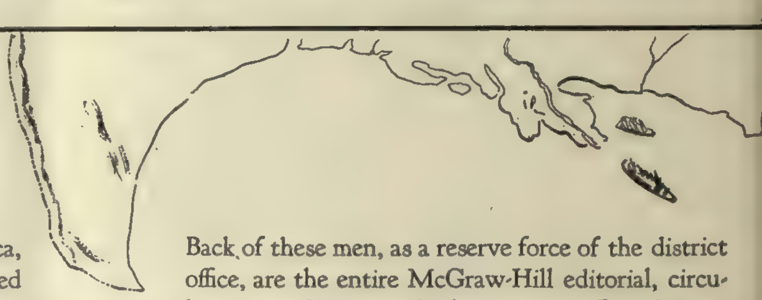
Goodyear Tires, made with that extra-durable, extra-elastic fabric developed by Goodyear for Goodyear Pneumatic Tires—SUPERTWIST—provide the last word in active, tractive, secure and long-wearing service at low tire cost per mile. Only Goodyear Tires are made with SUPERTWIST—yet they cost you no more.

More people ride on Goodyear Tires than on any other kind

BUS TIRES

Made with SUPERTWIST

Knowledge of Industr



In the heart of the industrial centers of America, the McGraw-Hill Publishing Company has placed its district offices—that manufacturers may have available quickly and conveniently the McGraw-Hill service, data and knowledge of industry.

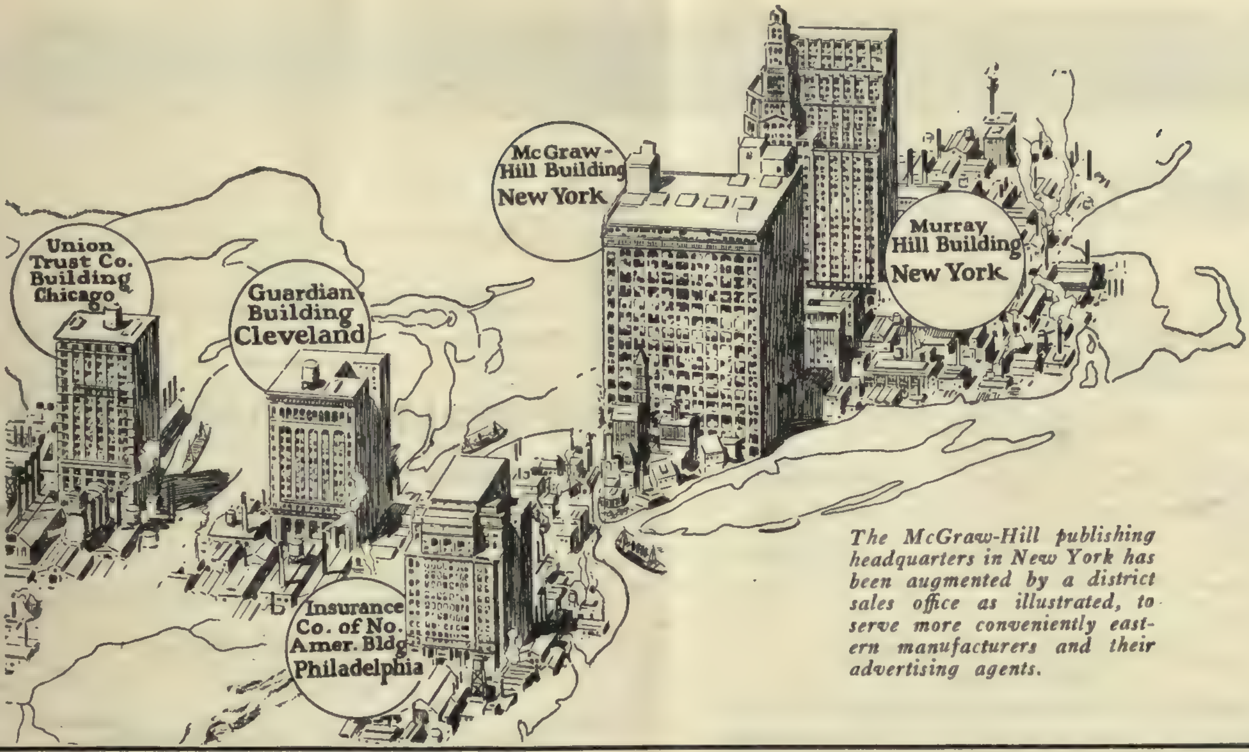
Every manufacturer who would sell industry more efficiently is now almost in the shadow of a McGraw-Hill office. Right at his elbow is the identical knowledge of industry and industrial marketing which has proved of such value to manufacturers who have availed themselves of it.

Each office is in charge of a district manager, who, through previous experience in industry or long service with McGraw-Hill, is well qualified to counsel with manufacturers on methods of selling to industry. His staff includes Marketing and Advertising men who have been drawn from industry, and whose contacts with industry are kept fresh by constant work on industrial selling problems.

Back of these men, as a reserve force of the district office, are the entire McGraw-Hill editorial, circulation, marketing and advertising staffs. Manufacturers consulting these district offices are thus assured all of the McGraw-Hill resources in applying the McGraw-Hill Four Principles of Industrial Marketing to their own selling.

These Four Principles are fundamental to waste-free selling. Briefly stated they are: (1) Determination of Markets; (2) Their Buying Habits; (3) Their Channels of Approach; (4) Appeals that Influence.

While each manufacturer is best able to apply these Four Principles for himself, the McGraw-Hill Publishing Company can be of material assistance in counseling with manufacturers and in either supplying data or suggesting how it may be obtained. This service is gladly furnished and we welcome the opportunity to serve manufacturers and their advertising agents in the interest of more effective marketing. A conference may be arranged, either in your office or a McGraw-Hill office.


Union Trust Co. Building Chicago
Guardian Building Cleveland
McGraw-Hill Building New York
Murray Hill Building New York
Insurance Co. of No. Amer. Bldg. Philadelphia

The McGraw-Hill publishing headquarters in New York has been augmented by a district sales office as illustrated, to serve more conveniently eastern manufacturers and their advertising agents.

Brought to Industry's Door

McGraw-Hill's District Office Facilities—

105 advertising salesmen, whose first function is to advise on marketing problems, serve industry and trade through McGraw-Hill district offices.

36 seasoned advertising planners and writers and 20 artists, all trained in the appeals and mechanics of industrial advertising, supplement the district offices' marketing staffs.

These men and 108 McGraw-Hill editors have a background of practical experience in selling or production in 58 broad classifications of industry.

All data relating to production, marketing and buying practices developed by any district office will be made available by any other district office.

McGraw-Hill has its own telegraphic facilities in New York headquarters for expediting contact with district offices and industry.

This district office set-up is in conformity with the McGraw-Hill Four Principles of Industrial Marketing which stipulate "selling in terms of the prospect's problems."

McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON

McGRAW-HILL PUBLICATIONS

45,000 Advertising Pages used Annually by 3,000 manufacturers to help Industry buy more effectively.

CONSTRUCTION & CIVIL ENGINEERING
ENGINEERING NEWS-RECORD
SUCCESSFUL METHODS

ELECTRICAL
ELECTRICAL WORLD JOURNAL OF ELECTRICITY
ELECTRICAL MERCHANDISING

INDUSTRIAL
AMERICAN MACHINIST INDUSTRIAL ENGINEER
CHEMICAL & METALLURGICAL ENGINEERING
POWER

MINING
ENGINEERING & MINING JOURNAL
COAL AGE

TRANSPORTATION
ELECTRIC RAILWAY JOURNAL
BUS TRANSPORTATION

OVERSEAS
INGENIERIA INTERNACIONAL
AMERICAN MACHINIST
(European Edition)

RADIO
RADIO RETAILING

CATALOGS & DIRECTORIES
ELECTRICAL TRADE CATALOG
ELECTRICAL ENGINEERING CATALOG
RADIO TRADE CATALOG
KEYSTONE CATALOG *(Coal Edition)* KEYSTONE CATALOG *(Metal-Quarry Edition)*
COAL CATALOG CENTRAL STATION DIRECTORY
ELECTRIC RAILWAY DIRECTORY
COAL FIELD DIRECTORY
ANALYSIS OF METALLIC AND NON-METALLIC MINING, QUARRYING AND CEMENT INDUSTRIES

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

C. B. BUCHANAN, President
W. H. PRICE, JR., Sec'y-Treas.
JOHN F. LAYNG, Vice-President

BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction,
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE
1904 Citizens National Bank Bldg.
Phone: Hanover: 2142
NEW YORK
49 Wall Street

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

WALTER JACKSON
***Consultant* on Fares and Motor Buses**
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

F. J. BRENNAN
Traffic Analyst, Schedules
588 Park Place Brooklyn, N. Y.

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

THE BEELER ORGANIZATION
ENGINEERS AND CONSULTANTS
Traction - Traffic - Equipment - Power Investigations
TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
COORDINATING SERVICE—FINANCIAL REPORTS
APPRAISALS—MANAGEMENT
52 Vanderbilt Ave. New York

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

KELKER, DeLEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
CHICAGO ST. LOUIS

Byllesby Engineering & Management Corporation
231 S. La Salle Street, Chicago
New York San Francisco

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

BRANCH OFFICES
BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

THE BABCOCK & WILCOX COMPANY
STEAM

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

BRANCH OFFICES
DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

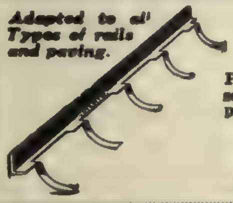
Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
Engineers and Contractors SYRACUSE, N. Y.

Our advertisement in the issue of October 9 showed how
HASKELITE and PLYMETL
have proved their claims to superiority.
Another full page ad will appear November 6
HASKELITE MANUFACTURING CORPORATION
133 W. Washington St., Chicago, Ill.

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
Street Railway Inspection DETECTIVES
131 State St. BOSTON

Hale and Kilburn SEATS
Better Quality Seats
For Cars and Buses
Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



Adapted to all Types of rails and paving.
GODWIN
Steel Paving Guards
Proven by service to economically prevent seepage and disintegration of street railway paving.
Write for Illustrated Catalog No. 20
W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

Coin Counting and Sorting Machines
FARE BOXES
Lever-Operated and Slip Change Carriers
The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.

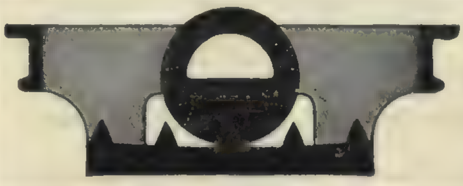
UNA
RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio

Eliminate rail joints
by
THERMIT-WELDING
METAL & THERMIT CORPORATION
120 Broadway, New York City, N.Y.

"Axle Specialist Since 1866"
Address all Mail to Post Office Box 515, Richmond, Va.
CAR AXLES
J. R. JOHNSON AND CO., INC.
FORGED STEEL AXLES
For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.

RAILWAY UTILITY COMPANY
CAR COMFORT WITH
UTILITY
HEATERS
REGULATORS
VENTILATORS
141-151 West 22d St.
Chicago, Ill.
Write for Catalogue
1328 Broadway
New York, N. Y.

Your Name
in this space in all issues where larger display space is not used backs up your advertising campaign and keeps your name in the alphabetical index.



STUCKI SIDE BEARINGS
A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting

The only homogeneous panel board

standard
for electric railway cars
and motor buses

The PANTASOTE COMPANY Inc.
At 46th 250 Park Avenue Street
NEW YORK

Whatever your requirements

specify

Le Carbone Carbon Brushes

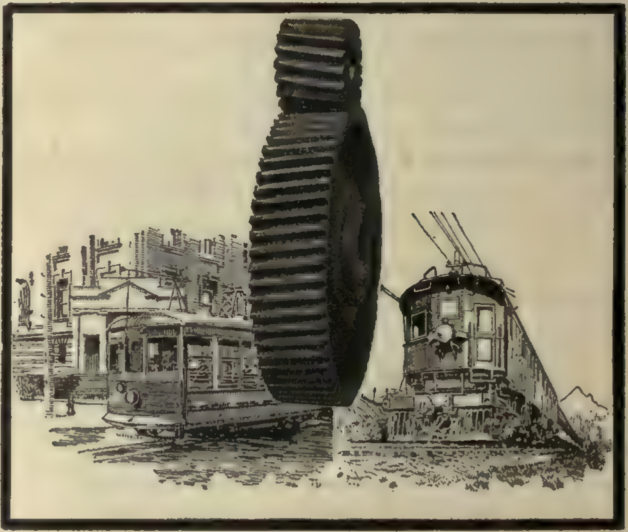
They talk for themselves

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

Nine Times Out of Ten

The quality of Electric Traction Service is in direct proportion to the quality of the equipment employed.



If you are not using Nuttall BP Helical Gears and Pinions, you have a way to a vast improvement in your equipment, and an inevitable improvement in your service.

If you are not using the New Nuttall 20-A trolley base you cannot only improve but can perfect that part of your equipment.

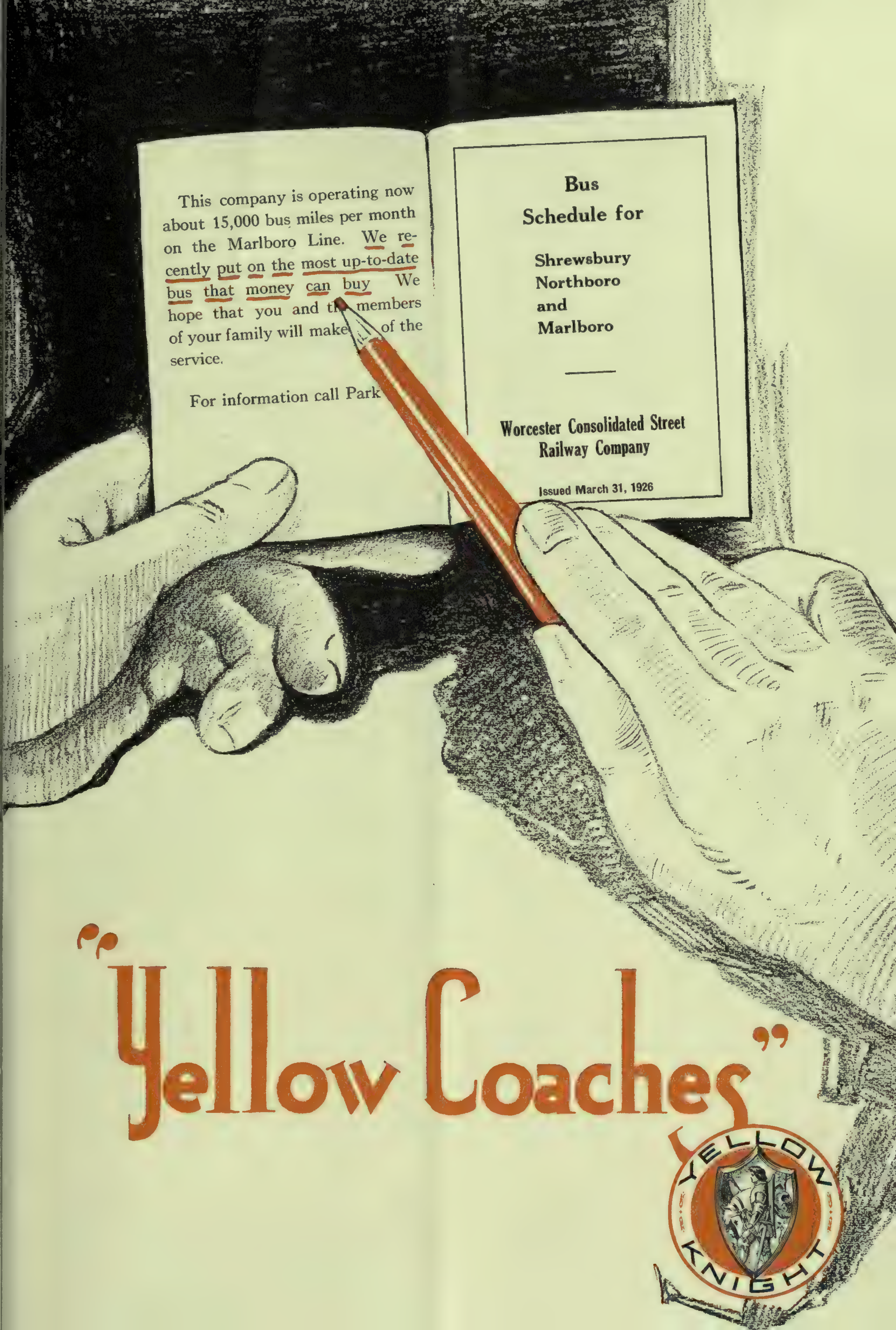
Every improvement in equipment brings a corresponding improvement in service, and every improvement in service shows instantly in more dollars and cents.

Let us send you our literature on the two sure money makers.

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railways and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall



This company is operating now about 15,000 bus miles per month on the Marlboro Line. We recently put on the most up-to-date bus that money can buy We hope that you and th members of your family will make of the service.

For information call Park

Bus Schedule for

Shrewsbury
Northboro
and
Marlboro

Worcester Consolidated Street Railway Company

Issued March 31, 1926

erating Cost 22.33 cents per mile

Building up profitable routes with Yellow Coaches

The Worcester Consolidated Street Railway Company, at Worcester, Mass., recently faced a problem quite common to many operating companies.

Certain lines were proving unprofitable. There was serious consideration of giving up the trolley and discontinuing any service whatever on one eighteen mile suburban run. Something had to be done, and the solution was found in motor coaches—Yellow Coaches.

Worcester, Mass., operates six 29-passenger *Z* Type and three Y Parlor Car Coaches, all used on suburban routes, placed there to build up the lines and act as business getters. As a result, former unprofitable lines were strengthened and new patronage induced.

During the first eight months of 1926, the Yellow Coach fleet carried 1,234,000 passengers.

Operating costs 21.08 cents per

Z Types show a total revenue of 29 cents per mile and an operating cost of 22.33 cents per mile, broken down as follows—

	Per Mile
Depreciation and maintenance of equipment	8.75
Conducting transportation	7.66
General and miscellaneous	2.81
Gasoline	3.11

The Y types show a total revenue of 31.47 cents per mile and an operating cost of 21.08 cents per mile, broken down as follows—

	Per Mile
Depreciation and maintenance of equipment	8.37
Conducting transportation	2.75
General and miscellaneous	7.10
Gasoline	2.80

As the Company states on the back of their operating schedule—*"We recently put on the most up-to-date bus that money can buy"*—

And that means Yellow!

financial stability

It is a tangible asset when you know that the company behind the motor coaches you buy today will be sound financially years from now.

Such assurance means protection against "orphan equipment," the certainty that your money is well invested.

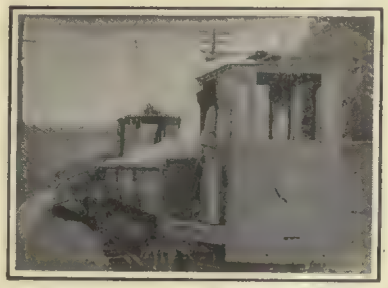
Yellow Coach plus General Motors comes to you with an unusual strength of welded interests. Transportation experience, research, manufacturing facilities, financial standing; all these are ready and waiting to serve you. The result is low-cost, profitable miles.

YELLOW TRUCK & COACH MFG. CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
[illegible] WEST DICKENS AVENUE, CHICAGO, ILL.

The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

BRANCH OFFICES

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Anderson Slack Adjusters
Economy Electric Devices Co., Power Saving and Inspection Meters
Yellow Coach Mfg. Company—Single and Double-deck Buses
Feasible Drop Brake Staffs

WM. WHARTON JR. & CO. INC.
TISCO MANGANESE STEEL TRACKWORK.

Wharton trackwork, in which the famous Tisco Manganese Steel has been used, will be found on the leading railways of the country.

Plant: Easton, Pa.

'CARNEGIE' *for* WHEELS AXLES RAILS CROSS TIES

Carnegie Steel Company
PITTSBURGH, PENNA.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

Lorain Special Trackwork
Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

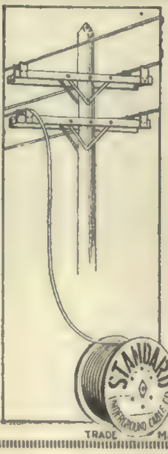
STANDARD

is the trade name for electric wires, cables and cable accessories whose superior quality has been demonstrated by 45 years of successful service.

If you are in the market for wires, cables or cable accessories get STANDARD prices before buying.

Standard Underground
Cable Co.

General Offices: Pittsburgh, Pa.
Branches in All Principal Cities.



Est. LUDLUM 1854

MOHAWK EXTRA

The master tool steel for milling cutters, boring tools, etc.

LUDLUM SPECIAL STEELS
LUDLUM STEEL COMPANY

WE HAVE A SPECIAL TOOL STEEL FOR EVERY SPECIFIC PURPOSE

STEELS SPECIAL PURPOSES
WATERVLIET-N.Y.-U.S.A.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches..............$4.50 an inch
4 to 7 inches.............. 4.30 an inch
8 to 14 inches.............. 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

ERJ

Over 6000 other men in the Electric Railway Field see this page—

Then

isn't this the logical place to advertise any business wants you may have of interest to Electric Railway men? Employment—Business—Equipment Opportunities, Etc., Etc., Etc.

POSITIONS VACANT

EXPERIENCED young man wanted, competent to take charge of inspection and maintenance of the buses and street cars on a small New England railway property. P-942, Electric Railway Journal, Tenth Ave. at 36th St., New York.

HIGH-GRADE car-house man wanted, to look after maintenance by a small railway property located in New England. P-943, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

OPERATING man: Capable of taking charge of transportation department of electric railway. Practical experience in each of its branches. Highest of references. PW-944, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SUPERINTENDENT transportation; wide experience; fine record on city and interurban properties; credited with having built up one of the best groups of trainmen in Middle West and placing property on paying basis. Wishes to make connection with property in need of clean cut, progressive, capable transportation official. PW-940, Electric Railway Journal, Guardian Building, Cleveland, O.

YOUNG man wants position providing an opportunity of learning electric railway practice. Graduate of a co-operative coarse in electrical engineering. PW-941, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

OFFICIAL PROPOSAL

Bids: Dec. 15.

Car Advertising Space

Honolulu, Hawaii.

Sealed proposals for the leasing of car advertising space in the street cars and buses operated by the Honolulu Rapid Transit Co., Ltd., of Honolulu, Hawaii, will be received at their office, 1133 Alapai Street, Honolulu, T.H., up to 12 o'clock noon, Wednesday, Dec. 15, 1926.

Specifications as to bids may be obtained from the office of the Company, the Electric Railway Journal or Electric Traction.

The company reserves the right to reject any or all bids.

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built

West. 508 or G.E. 264 Motors
Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

Searchlight Results:

Equipment For Sale:

"Our advertisement in the Electric Railway Journal located a buyer, and I have disposed of the car in question."

President—Buffalo Industrial Plant.

"We have disposed of all of our Girder Rails advertised in your paper. We are frank to tell you that the material went to three different traction lines and represents three separate and distinct new accounts. Our idea is that when it comes to bringing something to buyers in the traction field, there is but one sheet, and that is yours."

Dealer—New York City.

"There is no necessity for the continuation of this advertising, for the reason that we could have sold this equipment five times over from the advertisement that was run one time."

Superintendent—A Pennsylvania Railway Co.

Equipment Wanted:

"The two insertions of this advertisement which you displayed in admirable manner were sufficient to obtain for us the exact equipment that we desired."

Superintendent—A New England Railway Co.

Positions Vacant:

"The strongest proof that your Searchlight Department finds its way to many readers is shown by the numerous letters we have received in answer to our recent advertisement."

Secretary—A Connecticut Railway Co.

"You gave us one good man as a result of a similar advertisement in the Electric Railway Journal some time ago. Please give us another."

Proprietor of Steel Sales Agency.

Positions Wanted:

"The result of advertising in the Searchlight Section of your Electric Railway Journal I have secured a position with The —— Traction Co. of W. Va."

"I received 8 replies and accepted a position with the —— Railway Co. with over 30% increase in salary."

Business Opportunity:

"Advertisement for investment to develop or acquire Traction Light & Pr. "The results from the advertisement in Electric Railway Journal have been satisfactory."

New York City Attorney.

For Every Business Want: *"Think Searchlight First"*

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
Johnson & Co., J. R
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Carnegie Steel Co
Johnson & Co., J. R.
Ludlum Steel Co.

Babbitt Metal
Johnson & Co., J. R.

Badges and Buttons
Elec. Service Supplies Co
International Register Co.

Bearings and Bearing Metals
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells & Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Trackwork Co.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co

Bolts and Nuts, Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co
Electric Railway Improvement Co.
Elec. Service Supplies Co
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co
Westinghouse Tr. Br. Co

Brake Shoes
American Brake Shoe & Foundry Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.

Brushholders
Columbia Machine Works

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co.

Bus Wheels, Steel
Heywood-Wakefield Co.

Buses, Motor
Brill Co. The J. G
Yellow Truck & Coach Mfg. Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.
Columbia Machine Works

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. &. M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The, J. G.
Differential Steel Car Co

Cars, Gas, Rail
Brill Co., The, J. G.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co

Cars, Self-Propelled
Brill Co., The, J. G.
General Electric Co.

Castings, Gray Iron and Steel
American Steel Foundries

Catchers and Retrievers, Trolley
Elec. Service Supplies Co
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Conduits, Underground
Standard Underground Cable Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heat Co.
Elec. Service Supplies Co
Ohio Brass Co.

Controllers or Parts
General Electric Co.
Westinghouse E. & M Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co

Copper Wire
American Brass Co.
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Amer. Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.

Dealer Second Hand Rails
Electric Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
National Pneumatic Co.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
Amer. Steel & Wire Co.
Electric Service Supplies Co
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co

Electric Grinders
Railway Trackwork Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebling's Sons Co

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Beeler, John A.
Brennan, F. J.
Buchanan & Layng Corp.
Byllesby Co., H. M.
Day & Zimmermann, Inc
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flangeway Guards, Steel
Godwin Co., Inc., W. S.

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co.

Fuses and Fuse Boxes
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.
Westinghouse E. & M. Co

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J G.
Cincinnati Car Co.

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
Brill Co., The, J. G.

Gear Cases
Chillingworth Mfg. Co.
Electric Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Electric Service Supplies Co
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co
Westinghouse E. & M Co

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

(Continued on page 32)

TULC
A LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC
on your equipment
The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company.
Straus Bldg.

Arc Weld Rail Bonds
AND ALL OTHER TYPES
Descriptive Catalogue Furnished
American Steel & Wire Company
Chicago Boston Pittsburgh
New York Cleveland Denver
U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

"The Standard for Rubber Insulation"
INSULATED WIRES and CABLES
"Okonite," "Manson," and Dundee "A" "B" Tapes
Send for Handbook
The Okonite Company
The Okonite-Callender Cable Company, Inc.
Factories, PASSAIC, N. J. PATERSON, N. J.
Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle
OKONITE
Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.
OKONITE-CALLENDER
Can. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor G. Mendoza Co., Havana.

THE WORLD'S STANDARD
"IRVINGTON"
Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.
Sales Representatives in the Principal Cities

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

AMERICAN ELECTRICAL WORKS
AMELECTRIC
Wires and Cables
PHILLIPSDALE, R.I.
Reg. U. S. Pat. Office

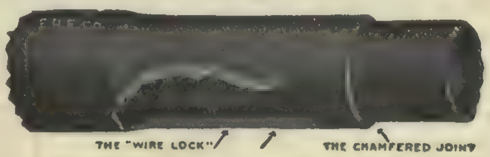
AMELECTRIC PRODUCTS
BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.
Boston, 176 Federal: Chicago, 20-32 West Randolph Street:
Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

"POSITIONS WANTED"
is the heading under which many excellent positions have been secured through the
"SEARCHLIGHT SECTION"
MEN! *Use* these columns for good jobs.
EMPLOYERS! *Consult* these columns for good men.

4 cents a word. Minimum 75 cents an insertion.
0131

ELRECO TUBULAR POLES



COMBINE
Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability
Catalog complete with engineering data sent on request.
ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co
Nuttall Co., R. D.
Star Brass Works

Headlights
Elec. Service Supplies Co
General Electric Co.
Ohio Brass Co.

Headlining
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heating Co
Gold Car Heat. & Ltg. Co
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Instruments, Measuring, Testing and Recording
Amer. Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co
Standard Underground Cable Co.
Westinghouse E. & M. Co

Insulating Silk
Irvington Varnish & Ins Co.

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Insulation (See also Paints)
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Insulators (See also Line Materials)
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Manganese Steel, Special Track Work
Bethlehem Steel Co.
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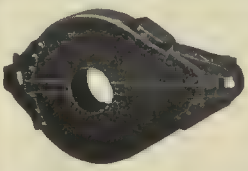
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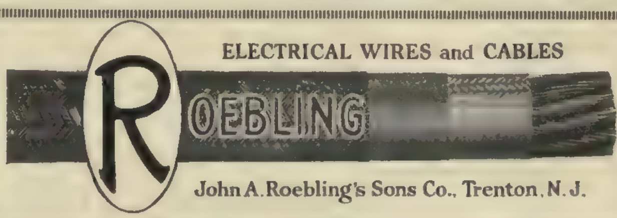
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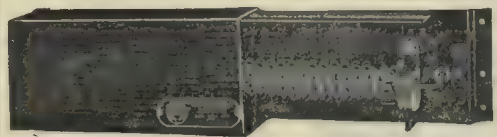
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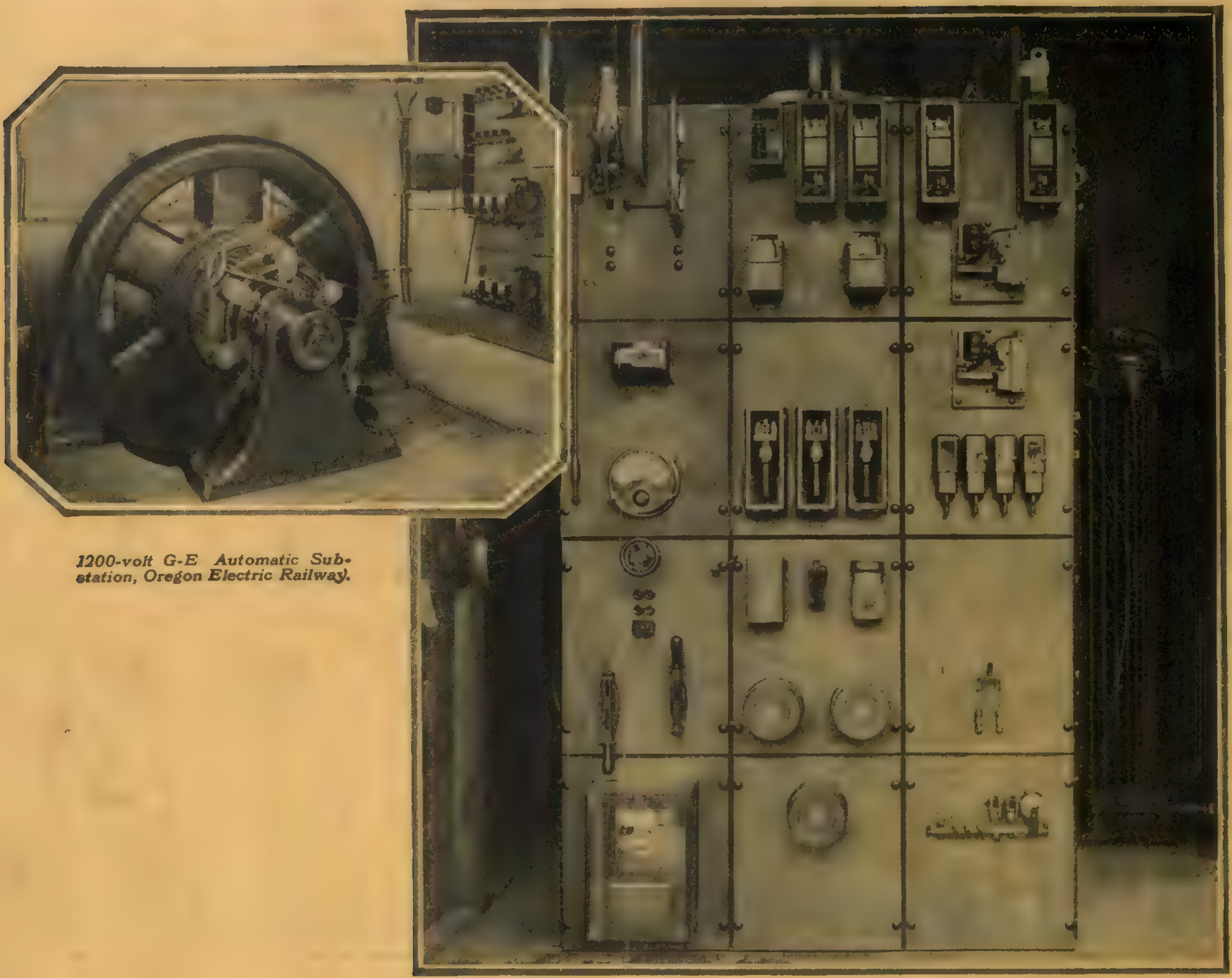

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